Another new development using

B.F.Goodrich Chemical *raw materials*

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If this is your problem:

You need a flexible material that is highly resistant to aromatic fuels, oils and solvent. The answer is Hycar 1041, a high acrylonitrile copolymer rubber—used in oil well parts, fuel cell liners, fuel hose, gaskets, O-rings, cements and adhesives. } —**Hycar** 1041

Your product needs to stand up in the presence of water, while also offering good oil resistance. Hycar 1042, a medium acrylonitrile copolymer, gives this combination—extremely useful for shoe soles, kitchen mats, sink topping and printing rolls. } —**Hycar** 1042

Or you must have a rubber that retains many of these other properties even at low temperatures. Hycar 1043 is a medium low acrylonitrile copolymer meeting these requirements, and easy to process. } —**Hycar** 1043

If low temperatures make your problem critical, Hycar 1014 may be the answer. It's a low acrylonitrile copolymer especially designed to emphasize this property. } —**Hycar** 1014

These are but a few of the many Hycar American rubbers that are tailored to meet specific requirements. Literature is available listing the properties of standard materials. For copies write Dept. EP-9, B. F. Goodrich Chemical Company, 3135 Euclid Ave., Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ont.

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American Rubber

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Reduced tire diameter means more revolutions per mile. The smaller diameter and lower inflation will result in more impacts per second . . . more abrasion . . . more flexing . . . more heat generated . . . more and more wear for every mile traveled! Today's more powerful engines, too, will put more torque on this smaller diameter tire during acceleration. Braking action, too, will be very severe.

Tires really need Philblack to withstand these severe conditions. Philblack E and Philblack I toughen tire carcasses . . . increase flex life . . . help dissipate heat . . . provide an effective armor against abrasion . . . add thousands of miles to the life of the tire!

Philblack I and Philblack E increase treadwear! With no sacrifice in hysteresis, you can get from 15% to 35% longer tread life, compared to HAF black tread compounds, by reinforcing tire treads with tough Philblack I or super-tough, long wearing Philblack E.

Call your Philblack technical representative for assistance or for practical advice on operational problems. This is a valuable part of Philblack's service.

*A trademark

Meet the Philblacks!

DISCOVER WHAT THEY'LL DO FOR YOU!

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Ideal for smooth tubing, accurate molding, satiny finish. Mixes easily. High, hot tensile. Disperses heat. Non-staining.

I — **Philblack I ISAF Intermediate Super Abrasion Furnace Black**
Superior abrasion resistance at moderate cost. Very high resistance to cuts and cracks. More tread miles at high speeds.

O — **Philblack O HAF High Abrasion Furnace Black**
For long, durable life. Good electrical conductivity. Excellent flex. Fine dispersion.

E — **Philblack E SAF Super Abrasion Furnace Black**
Toughest black on the market. Extreme abrasion resistance. Withstands aging, cracking, cutting and chipping.

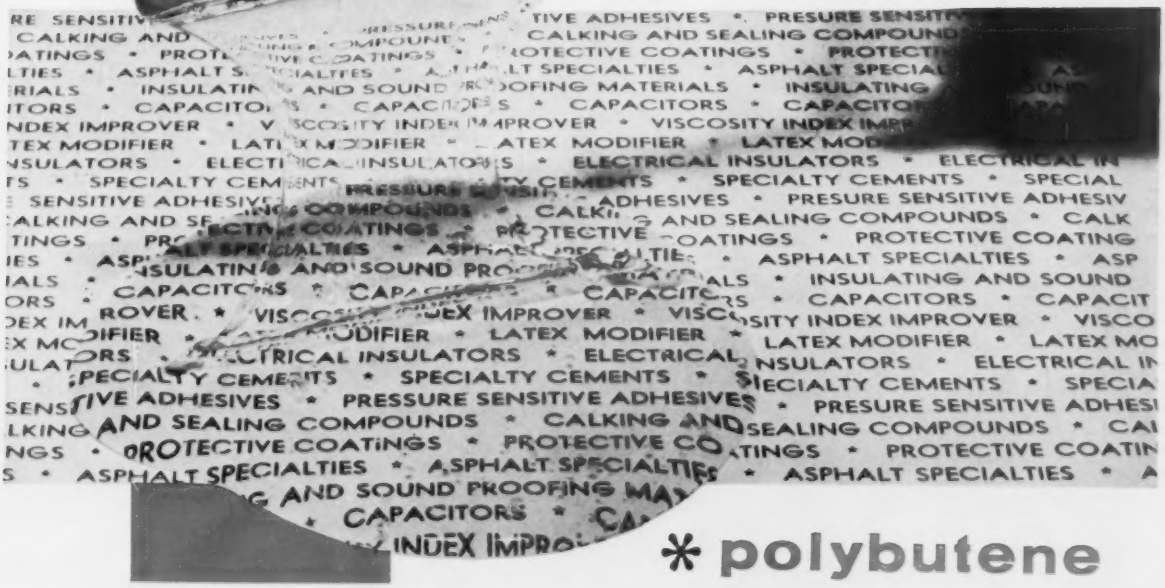
Phillips 66

PHILLIPS CHEMICAL COMPANY, Rubber Chemicals Division, 318 Water St., Akron 8, Ohio. Export Sales: 80 Broadway, New York 5, N. Y.
West Coast: Harwick Standard Chemical Company, Los Angeles, California.

New!

COSDEN

* POLYVIS



* polybutene

Cosden POLYVIS is an oily, liquid synthetic polymer. Its viscosity and tackiness increase with molecular weight. Cosden POLYVIS has an excellent color, almost water white, and possesses extreme clarity. It is not subject to normal atmospheric oxidation, has excellent aging characteristics and does not deteriorate or depolymerize during storage. Cosden POLYVIS retains its tackiness and viscosity, and does not harden, set or dry nor become gummy or waxy.

Polybutenes lend themselves to many diverse applications. The high degree of stability and the modifying effect upon the properties of other materials are characteristics which render Cosden POLYVIS applicable in a wide variety of industrial uses.

Price, delivery information and complete specifications on viscosity ranges for your particular needs will be sent promptly on request.

CHEMICAL COSDEN DIVISION

COSDEN PETROLEUM CORPORATION

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Here's a truly revolutionary development in materials handling. It's a fabric/CHEMIGUM "tank" that permits military, industrial or farm personnel to roll their own supplies of water, fuels or liquid chemicals, where and as they please.

Resembling an overgrown, low pressure tire in both appearance and operation, this tank holds approximately 250 gallons, yet is readily rolled, singly or in tandem hook-up over virtually any terrain. Because of extremely low ground bearing pressure, even when loaded, it is easily towed in trains or individually maneuvered by one man. And although light enough to float in water when filled, it is strong enough to withstand a 15 foot drop without bursting.

In considering the rubber to be used throughout the tank, the compounders confined themselves only to CHEMIGUM—first, now finest of the nitrile rubbers. Their reason: Of the various oil-resistant rubbers available, only CHEMIGUM offered the following combination of properties required for this application: 1. Outstanding resistance to fuels of up to 40% aromatic content plus a range of chemicals 2. Good physical properties plus resistance to abrasion and aging 3. Good low temperature properties 4. Low specific gravity 5. Ease of processing.

Rolling tanks constitute only one of many interesting uses for CHEMIGUM. If you have a product requiring unusual oil-resistance coupled with physical properties and processability approaching those of styrene rubbers, why not consider CHEMIGUM – either alone or in a combination with PLIOFLEX – Goodyear's styrene rubber. CHEMIGUM can also be used to advantage as a plasticizer for vinyl and phenolic resins or in combination with a high styrene copolymer, such as PLIOLITE S-6B, for hard or semi-hard rubber applications.

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AKTONE —Activator for Thiazole and Thiuram accelerators. Produces marked increase in activity with little increase in scorchiness. Particularly effective in blends of GRS and natural rubber. Widely used to eliminate odor of blowing agent in closed-cell sponge.

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Rubber Age

COVERING THE MANUFACTURE OF RUBBER AND RUBBERLIKE PLASTICS PRODUCTS

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A Study on Vistex Gel Points in Various Types of Polymers—*By T. B. Larchar, W. K. Taft, J. Duke, H. R. Mooney and J. M. Gyenge* 971

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Microfilm copies of complete volumes of RUBBER AGE are available from: University Microfilms, 313 North First St., Ann Arbor, Mich.

Indexed in Industrial Arts Index and Engineering Index

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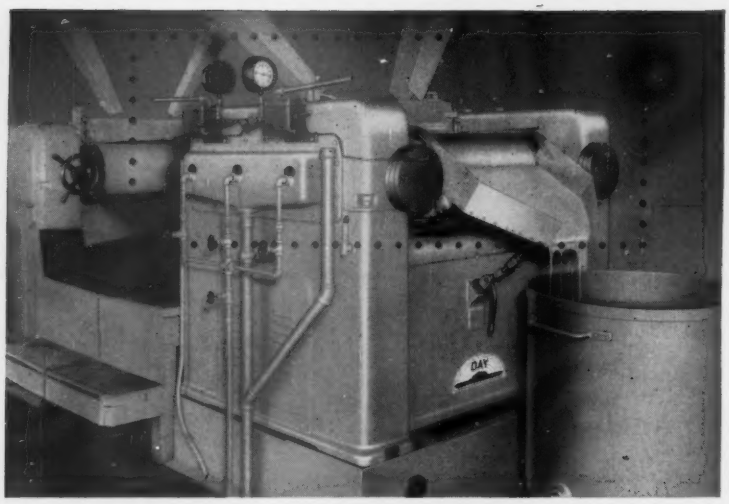

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games.....are.....
over.....

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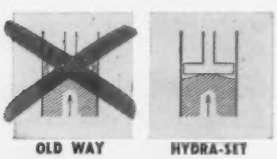

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Letters to the editor

More on Tubeless Tires

The sad experience of a member of the rubber industry with tubeless tires was detailed in these columns in our July, 1956, issue. His conclusion was that tubeless tires were not dependable and he suggested that the tire designers take another look at the problem. This letter was called to the attention of several of the tire manufacturing companies and comment was invited. The letter reproduced below is typical of the replies received to date.—ED.

Dear Sir:

. . . regarding the item on "Tubeless versus Tubes" in the July issue of RUBBER AGE . . . we have prepared, for your use, a list of questions and answers on the subject of tubeless versus tire and tube combinations (attached to letter).

Millions of tire miles accumulated on taxi fleets, where tire performance checks are accurately kept, clearly show that all of the advantages—ride, even wear, increased mileage, less down time (due to punctures and other failures) and better recappable tire bodies—are on the side of tubeless tires.

The rubber industry was confronted with a similar situation when it made the change from high to low pressure pneumatics in the 20's and we have yet another coming up in the move from 15- to 14-inch tires.

There are doubtless a large number of tire users who will prefer and continue to use tubes in their tires for some time to come. We sincerely believe, however, that these people will steadily decrease in number and that in the not too distant future, tubeless tires will take over completely.

H. S. RICHARD
Firestone Tire & Rubber Co.
Akron, Ohio

For the Record

Dear Sir:

With reference to your editorial "End of an Era" in your August issue, the Government Laboratories played a valuable part in the establishment and development of the manufacture of general-purpose synthetic rubber in this country. They provided a means for examining without delay suggested methods for improving the technique of manufacture and the uniformity and quality of the product.

A further contribution made by the Laboratories was in examining the possibility that by replacing the styrene in GR-S by some other monomer a product of markedly improved quality might be obtained. The number of monomers offering themselves as possible substitutes for styrene was so large that much ground had to be covered to reach assurance that a good bet was not being overlooked. The results of this phase of

In these five Standard Units are all the necessary components to control effectively the degradation mechanisms that take place in polyvinyl chloride resins on aging, during heat processing or on exposure to sunlight. They are widely used alone and in combinations for specific effects in clear and opaque stocks. Their advantages have been proven over other tested materials, such as those based on tin (which frequently decolorizes effects of degradation without correcting them) or on lead (which frequently contributes to oxidation and breakdown on aging). To correct special conditions encountered in each Vinyl Processing Industry, we also supply combinations of selected components in these five Standard Units.

Write for information about stabilizers designed for versatile and inexpensive use in formulations employed in your particular vinyl processing industry.

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Quality Vinyl Flooring?
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the Laboratories' work are recorded in the chapter by Taft and Tiger in the book "Synthetic Rubber".

There is a slight mistake in the article in regard to my own connection with the Laboratories. I was never their manager. I worked closely with the late Dr. H. E. Simmons (then on Col. Dewey's staff) on the first plans for the Laboratories, but after the latter were in operation my connection with them was merely a loose one.

G. S. WHITBY

Institute of Rubber Research,
University of Akron,
Akron, Ohio

. . . To keep the record correct. Dr. Whitby never had any position with the Government Laboratories. He directed a research project at the University, but it was entirely separate from ours.

JAMES W. SCHADE

2072 Ayers Ave.,
Akron 13, Ohio

It should now be evident from the above letters that Dr. Whitby did not serve at any time as manager of the Government Laboratories at Akron, as indicated in last month's editorial. We put him in this post between Dr. Schade and Dr. Taft. We are glad to set the record right but are certain that if Dr. Whitby had held the post he would have done justice to it.—ED.

More Help Wanted

Dear Sir:

Would it be possible for you to assist us in making contact with American manufacturers of "road markers." The type in which we are interested is the compounded rubber or plastic strip sometimes embodying ground reflecting glass, which is applied to the road surface with adhesive in order to form guide lines, etc. Our purpose in wishing to contact such a firm is the possibility of concluding arrangements whereby we could produce it here similarly under license. Any help you would be able to give us to this end would be greatly appreciated.

W. A. INGRAM

Lea Bridge Rubber Works,
London, England

Dear Sir:

Could you please send us the names and addresses of manufacturers who could supply rubber stoppers, solids, one and two holes, made of live, soft, springy, pure gum latex. We sell to schools, hospitals, laboratories, private industry and government.

R. FORSCHMIEDT

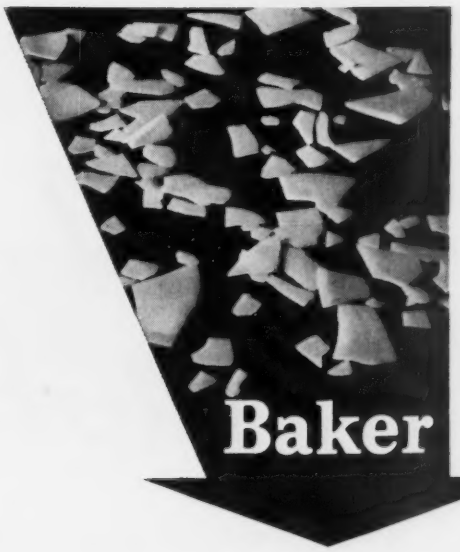
Towhee Enterprises,
1016 First Ave. So.,
Seattle 4, Wash.

Dear Sir:

We desire to contact rubber technicians who may be willing to advise us on the manufacture of fabric gloves and gauntlets coated with neoprene latex.

H. G. THOMPSON

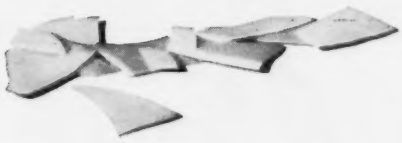
Trentham Mfg. Co.,
Kensington Works,
Ilkeston, England



Here's news!

Baker CALCIUM NITRATE, Tech.
ZINC NITRATE, Tech.

in THIN FLAT FLAKES



- *Faster dissolving*
- *Uniform purity—lot after lot*
- *Controlled water of hydration*
- *Easier to handle*

Look over the photograph above, reproduced to actual size. Note the thin flakes with large surface area. THIN FLAKES go into solution FAST – you save time and money. They are easy to handle. These chemicals in *flake* form represent another Baker first.

Latex processors gain better control of coagulation because of the controlled high assay and known water of hydration. This uniform purity, controlled pH and freedom from extraneous matter insure better quality in your finished goods with fewer rejects.

These chemicals are produced to meet precise specifications. In the informative typical analysis shown below, note the very low ammonium nitrate content in Baker Calcium Nitrate. The exceptionally low copper and manganese contribute to longer life for your latex products, with less tendency to oxidize and become brittle or too soft.

These features of Baker Calcium Nitrate and Zinc Nitrate also are helpful to manufacturers of rustproofing specialties, textile finishes, pigments, adhesives and lithographic materials.

Because of the low melting points and deliquescent nature of these chemicals, they are packaged with polyethylene liners and are stored in an air conditioned warehouse at a temperature below 85°F.

Write for samples and prices for these new *flaked* products, Calcium and Zinc Nitrate Technical.

CALCIUM NITRATE, Technical Flake	*Typical analysis*
Assay (as $Ca(NO_3)_2$)	71.8 %
Water of Hydration	27.6 %
Insoluble and NH_4OH Ppt.	0.03 %
Ammonium Nitrate (NH_4NO_3)	0.1 %
Magnesium & Alkalies (as NO_3)	0.4 %
Iron (Fe)	0.0003%
Copper (Cu)	0.0004%
Manganese (Mn)	0.001 %
pH of 5% Solution	6.3
Thin (0.025 in.) flakes about ½ inch in size with the following typical mesh analysis:	
On U.S. No. 4	45%
Thru U.S. No. 20	8%

ZINC NITRATE, Technical Flake	*Typical analysis*
Assay (as $Zn(NO_3)_2$)	74.2 %
Water of Hydration	25.6 %
Insoluble Matter	0.008 %
Iron (Fe)	0.001 %
Lead (Pb)	0.005 %
pH of 5% Solution	5.1
Thin (0.035 in.) flakes about ½ inch in size with the following typical mesh analysis:	
On U.S. No. 4	26%
Thru U.S. No. 20	9%

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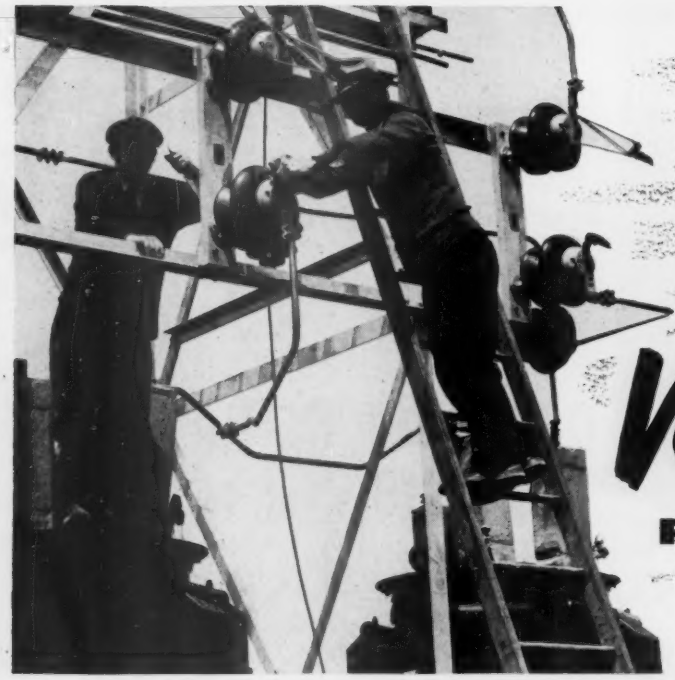

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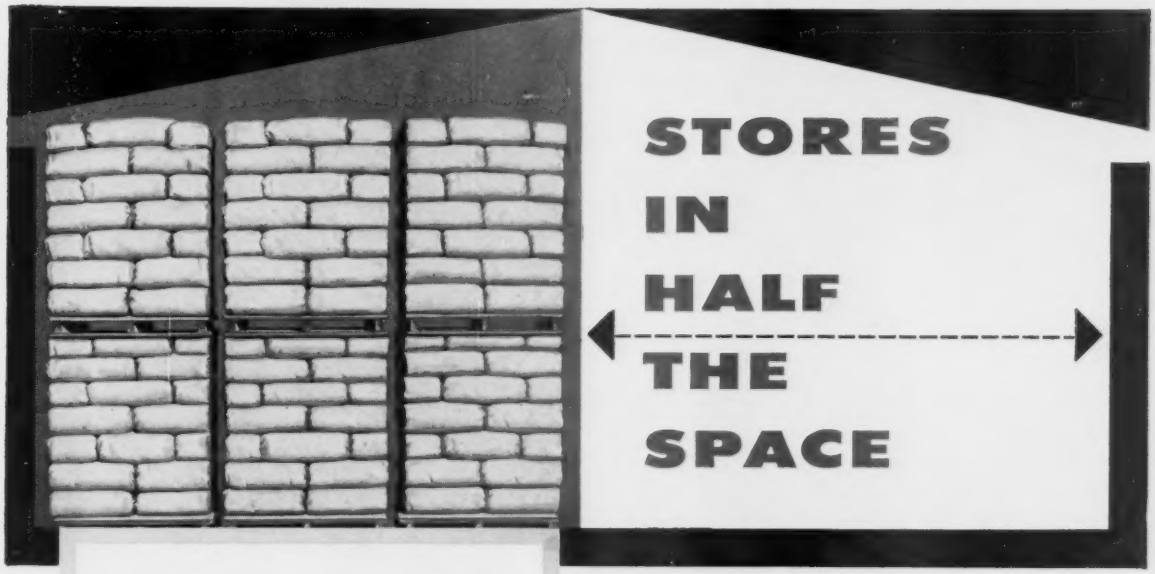

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AZODOX is factory-tested and proved. Now available in sample lots or carload quantities for your use *at the same price of conventional zinc oxides.*

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AZODOX is available in all grades of American process lead-free zinc oxide.

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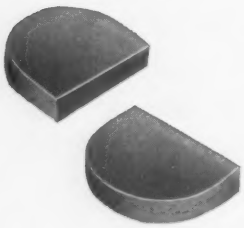

You can get outstanding advantages, both in processing and end-product benefits, with Durez phenolic resins especially designed for compounded stocks or solvent-type adhesives. The familiar top lift of GRS rubber is a typical example.

During processing, resins formulated for GRS serve as effective plasticizers. But these Durez resins have no thermoplasticity after cure and thus serve to prevent both cold flow and distortion under heat. This dimensional stability under load enables top lifts to retain their shape, adding to walking comfort and attractive appearance throughout their service life. And the service life itself is longer because of the resins' resistance to abrasion.

With GRS, Durez resins are effective in small percentages—even as little as 5 to 10 parts of resin on 100 of rubber show results. If you have not looked into the advantage of phenolic resins in GRS, Buna N and other types of synthetic and natural rubber, you may find it highly profitable to talk things over with us. As a starter, let us send you the latest edition of our bulletin on Resins for the Rubber Industry.

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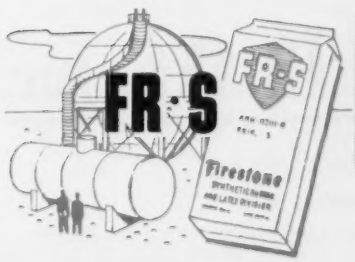
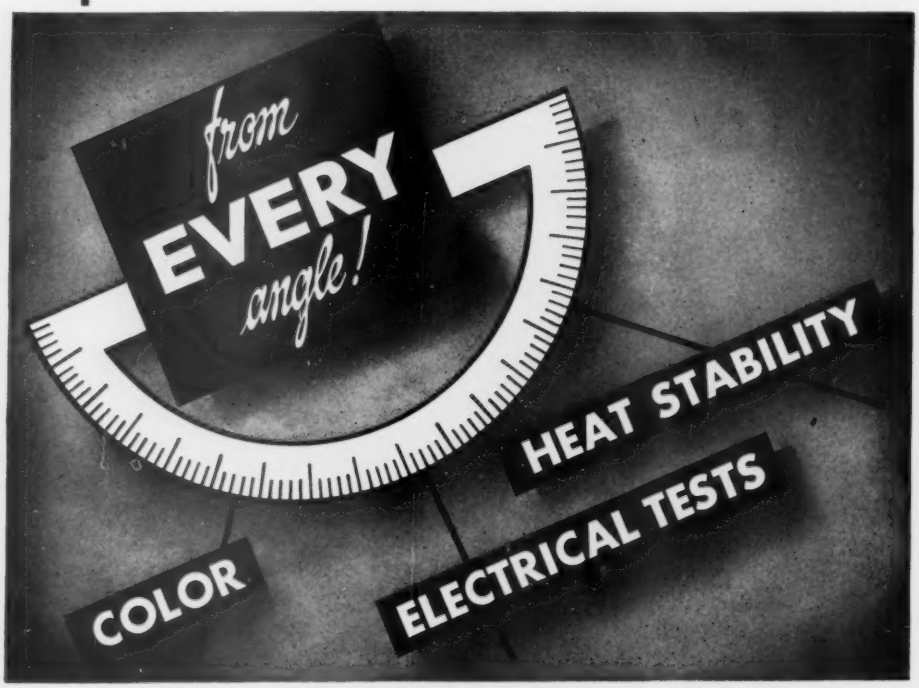
Learn how Firestone high quality latex and dry rubber can fit into your operation and improve the quality of your product. Why not write today for your copies of the new, colorful, informative brochures on Firestone's new FRS Latex and Dry Rubber. There's no charge, of course. Just drop a line to Firestone Synthetic Rubber and Latex Division, Akron, Ohio.



Firestone

BEST IN RUBBER



PIGMENT NO. 33

for Compounding

VINYLS AND SYNTHETIC RUBBER

Sample and technical data sent promptly on request

SOUTHERN CLAYS, Inc.

33 RECTOR STREET
NEW YORK 6, N. Y.

One of a series on trails and transportation

From Traders To Tourists

THE articles of commerce required in the first business operations on the North American continent were simple, indeed. Colorful blankets, woolen and cotton cloth, beads, trinkets, paint, iron, awls, rum and whiskey — these were used in the fur trade between the European and the American Indian.

As distances from the seaboard to the interior lengthened — particularly from the French settlements on the St. Lawrence, Quebec and Montreal — transportation became more and more important, especially as competition between nations increased. The fur traders relied on that wonderful product of the Indian — the canoe. Over limitless waterways and backbreaking portages the first exchange of goods was carried on and a continent began to be opened up.

Today in this area the white waters of turbulent rivers and the placid and stormy waters of lakes still flow, but the land is settled, and commerce of worldwide importance takes place in this land of fur-trader, voyageur and hunter.

And today this is also the land of the tourist — the motor tourist — who comes to see and enjoy the shining waters of the lake country. This, too, is a new industry, comparatively speaking. Touring on the modern scale began when the rubber tire became more dependable and the family car could conveniently journey hundreds of miles from home in a very short time. The moment of new dependability came when carbon black was added to rubber — longevity, hard wear and greater comfort were the results. United Blacks have been in the forefront of this progress, a standard of excellence in the United States, the provinces of Canada and throughout the world.

UNITED CARBON COMPANY, INC.

United Blacks . . . they are the quality blacks so dependable and so helpful in today's rubbers. UNITED BLACKS are used everywhere, for every rubber need.

DIXIE 70 ISAF — Ideal for toughest treads, maximum mileage tires, for gruelling high speed highway operations, and for high electrical conductivity.

DIXIE 60 HAF — Recommended for good processing, highest reinforcement, extra mileage tires, tread rubber (camelback), and outstanding resistance to cuts and cracks.

DIXIE 50 FEF — Superior as processing aid; for imparting good, smooth, fast extrusions; for maintaining dimensional stability; for dissipating heat.

DIXIE 40 HMF — Recommended for good processing, substantial reinforcement, ready dispersion, high rebound, low heat build-up, high resistance to flex.

DIXIE 35 GPF — For tire body stocks and general purpose applications where high resiliency, low heat build-up, high strength at elevated temperature and good flex resistance are essential.

DIXIE 20 SRF — Excellent for highly loaded rubber goods; easy and cool mixing; semi-reinforcing; low in heat generation; high in resilience.

DIXIEDENSED 77 EPC — Recommended for good processing, for high level of reinforcement, high tensile strength, good resistance to abrasion.

DIXIEDENSED S-66 MPC — For rubber goods requiring high reinforcement, high tensile strength, highest resistance to tear and good resistance to abrasion.

DIXIE BB (Voltex) CC — Ideal in polyethylene for resistance to ultraviolet radiation; for coloring of plastics and for high electrical conductivity.

Keep in step with the times . . .

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UNITED CARBON COMPANY, INC.

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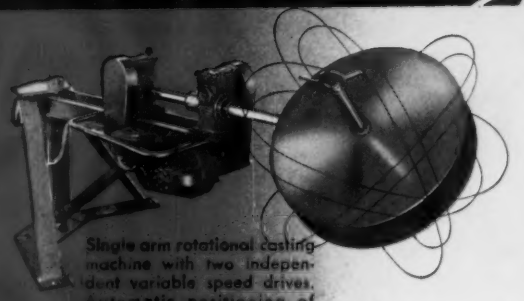
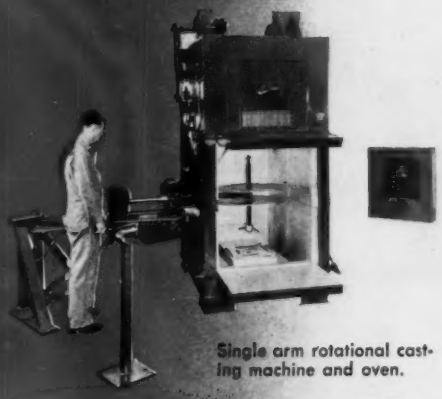
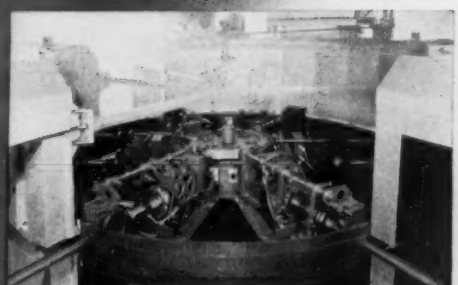
Announcing ... ROTATIONAL CASTING



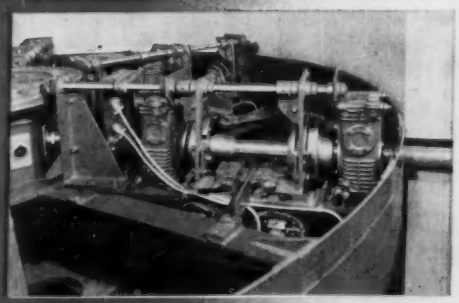
Single arm rotational casting machine with two independent variable speed drives. Automatic positioning of mold wheel for convenient mold servicing.



Single arm rotational casting machine and oven.



Multiple arm casting machine showing separate drive, clutches and brakes for mold rotation in each of the two planes. Designed for precise stopping necessary with automatic mold opening and closing.



Turntable style with six arms. An additional six arms can be added for a total of 12.

Significant Advance for Plastic Production

Machines engineered and built to your specific requirement. Following are some of the features built in our SPECIAL MACHINES.

Two groups of molds per arm, arranged for simultaneous rotation around two axes perpendicular with each other.

Two separate and variable speed drives rotate the molds around each axis. This action controls wall thickness for different product shapes.

Movement of arms is indexed for stop and go—not a continuous movement. Stopping time in oven or at the mold's service position can be varied.

Rotation of molds can be automatically stopped or started at service position and oven entrance.

Molds are automatically positioned for convenient opening, stripping, filling and closing.

A 30-inch diameter mold area allows a large range of mold sizes and flexibility of arrangement.

Arms, oven units and service stations can be added to increase capacity and mold servicing.

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If high raw materials costs cause you sleepless nights, don't send for barbiturates; send for a Velsicol Representative. He will explain how manufacturers of rubber compounds secure improved characteristics with Velsicol Hydrocarbon Resins, saving raw materials without degrading quality. He can supply samples for test in your plant evaluation program, and assist you with technical services available through the Velsicol Resin Laboratories. Contact him soon. You won't be obligated, and you'll probably find the answer you're looking for.

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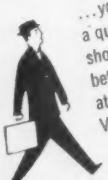
Look for this man!



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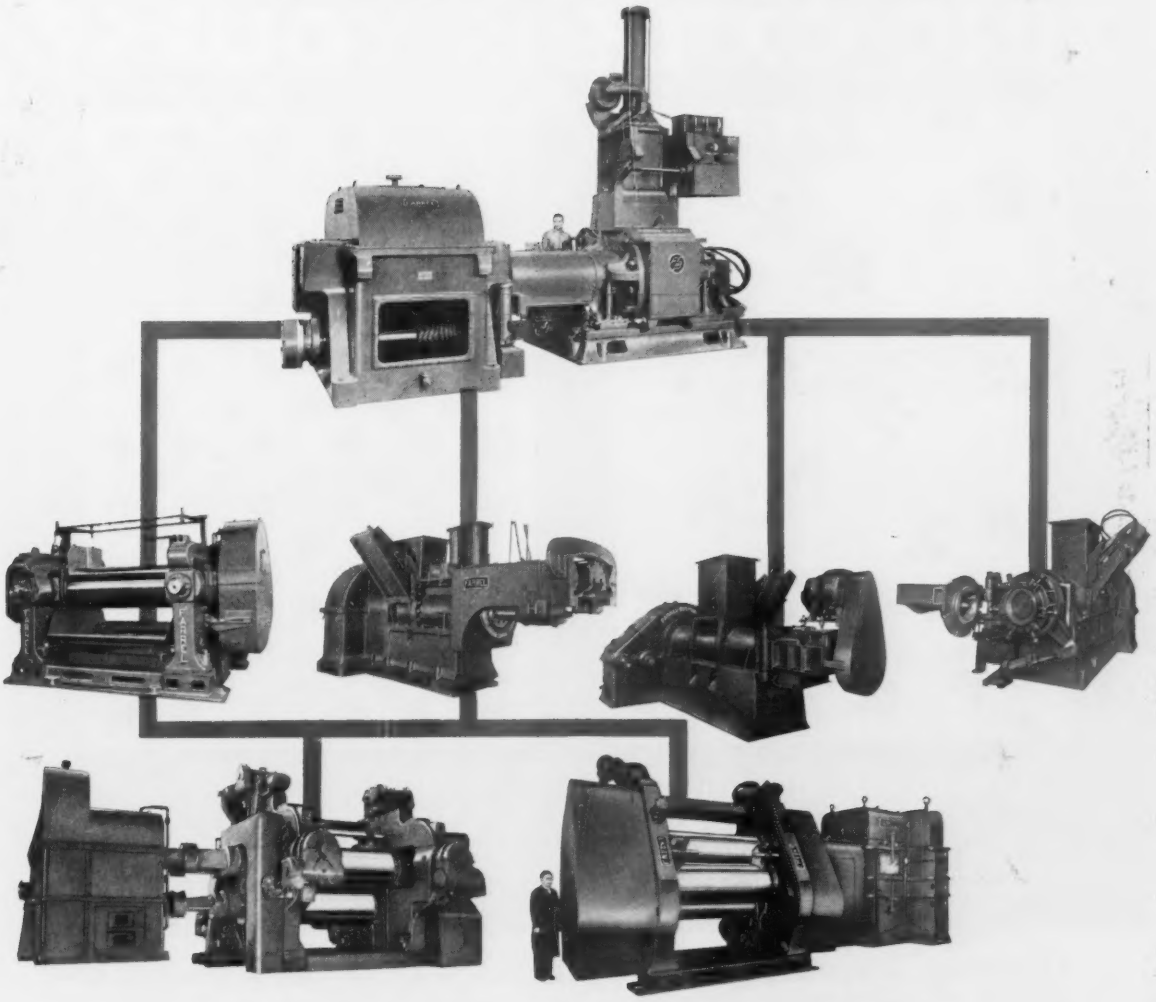
Matched production units: key to processing efficiency



Farrel-Birmingham® units for processing rubber and plastics—such as Banbury® mixers, mills, calenders and extruders—are built in a wide range of sizes with many optional features. When specific requirements are known, we can recommend machines of correct capacity and design to operate in sequence most efficiently. All necessary auxiliary equipment of proper design and capacity can also be engineered into your layout and can be furnished by Farrel-Birmingham to make your installation complete, with engineering responsibility centered at one source.

In such a layout, production flows evenly without costly interruptions caused by the starving or choking of succeeding machines. Furthermore, manual aid and supervision are reduced to a minimum. In some cases an individual machine will require no operator at all.

Before you purchase new processing equipment, why not look into the advantages of F-B® matched production units? Just tell us what your requirements are, and we shall be glad to quote you on matched units which will improve production efficiency and cut handling costs through planned processing flow.

FB-1090

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Plants: Ansonia and Derby, Conn., Buffalo and Rochester, N.Y.
Sales Offices: Ansonia, Buffalo, Akron, Chicago, Fayetteville (N. C.), Los Angeles, Houston.

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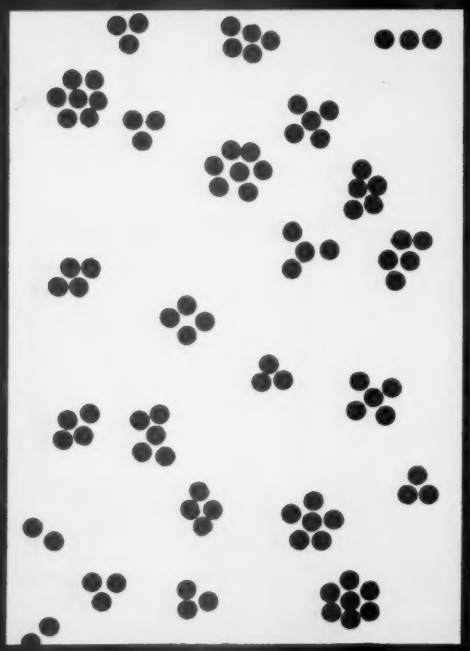
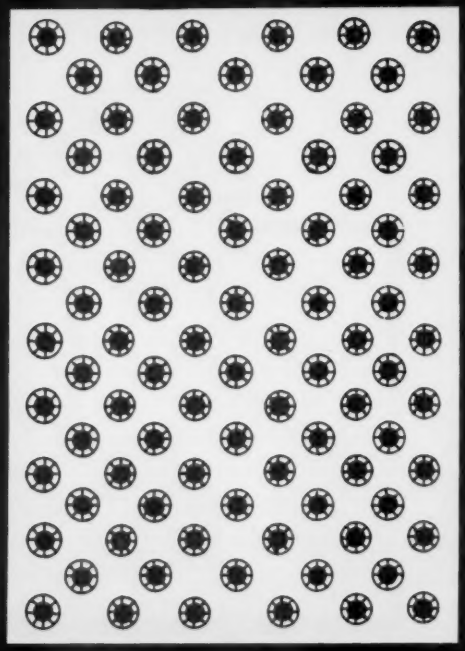
Farrel-Birmingham®

WHICH ZINC OXIDE IS YOURS?



CONVENTIONAL ZINC OXIDE

Conventional zinc oxide disperses in rubber more slowly than Protox-166 because its particles are generally highly aggregated, especially in cold or humid weather.



PROTOX-166 ZINC OXIDE

Protox-166 zinc oxide disperses in rubber readily and improves modulus because the particles are predispersed and coated with zinc propionate.

These illustrations show schematically the marked difference between particles of Protox-166 and those of conventional zinc oxide. Protox-166 is essentially free of aggregates because the particles are coated with zinc propionate. That patented* coating, exclusive with Protox zinc oxides, imparts the following properties to the pigment:

1. Insulates the particles from one another
2. Reduces moisture pickup in humid atmospheres
3. Provides an organophilic surface readily wet by rubber
4. Increases bulk density

These properties cut your processing costs and improve the quality of your products in these ways:

1. Faster incorporation and dispersion in rubber
2. Less need to masterbatch zinc oxide
3. Higher modulus

THE NEW JERSEY ZINC COMPANY

Producers of Horse Head Zinc Pigments

. . . most used by rubber manufacturers since 1852

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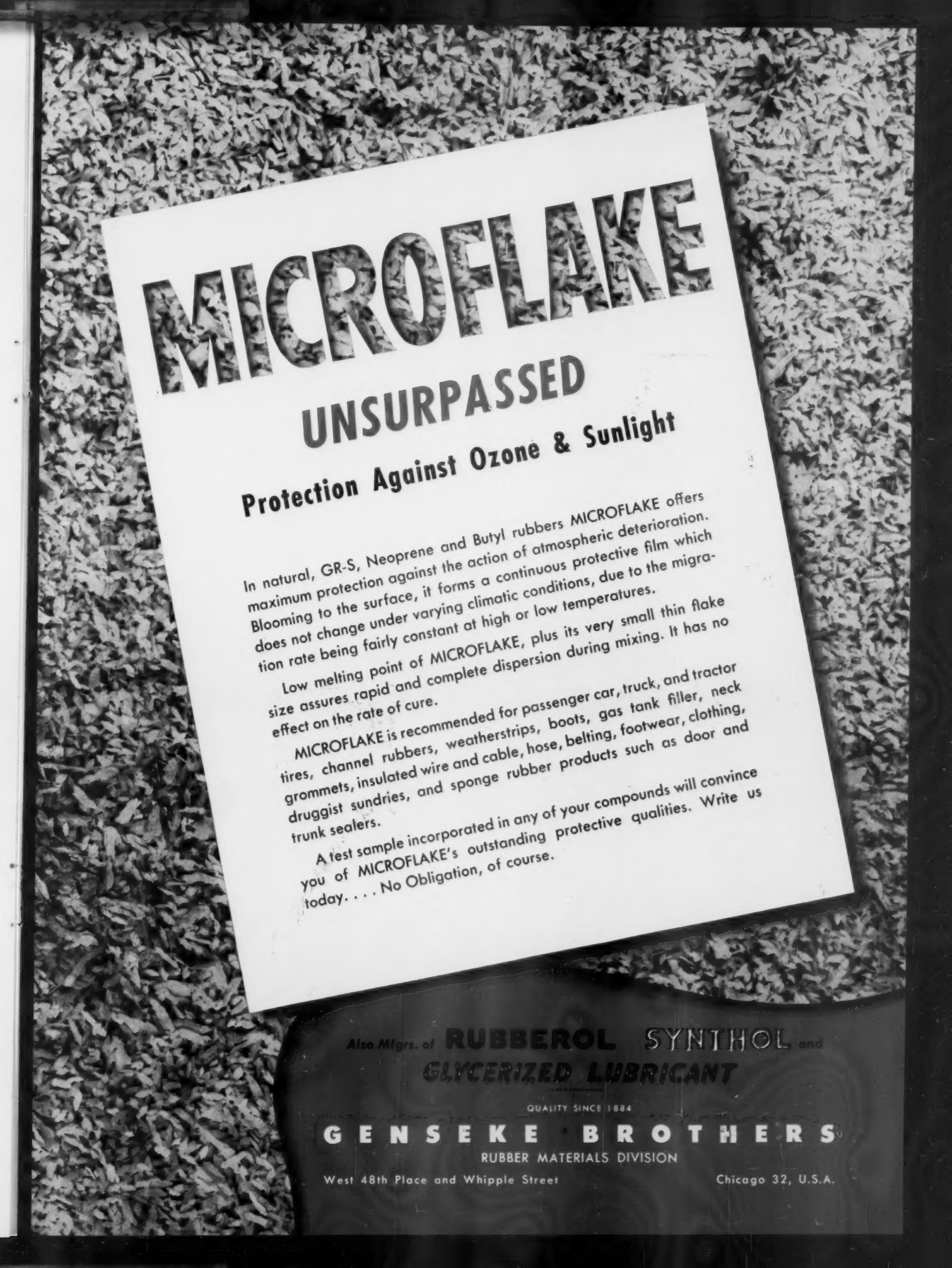
MICROFLAKE
UNSURPASSED
Protection Against Ozone & Sunlight
In natural, GR-S, Neoprene and Butyl rubbers MICROFLAKE offers maximum protection against the action of atmospheric deterioration. Blooming to the surface, it forms a continuous protective film which does not change under varying climatic conditions, due to the migration rate being fairly constant at high or low temperatures.
Low melting point of MICROFLAKE, plus its very small thin flake size assures rapid and complete dispersion during mixing. It has no effect on the rate of cure.
MICROFLAKE is recommended for passenger car, truck, and tractor tires, channel rubbers, weatherstrips, boots, gas tank filler, neck grommets, insulated wire and cable, hose, belting, footwear, clothing, druggist sundries, and sponge rubber products such as door and trunk sealers.
A test sample incorporated in any of your compounds will convince you of MICROFLAKE's outstanding protective qualities. Write us today. . . . No Obligation, of course.
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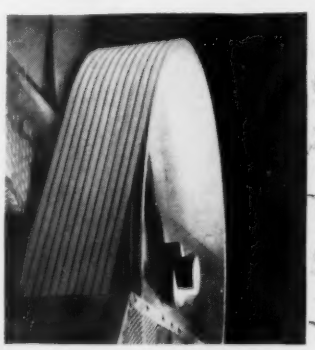
Manufacturers of V-belts continually specify Enka high tenacity rayon, and for the best of reasons: ***greater strength*** with longer flex-life and lighter weight; less heat generation; unusual stability; exceptional adhesive properties. All these factors combine to provide superior products for many industries ***at lower cost.*** Consider how your business could profit from American Enka's progressive thinking and call American Enka today.



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Let your Cabot representative help you to select the grades best suited to your individual requirements . . .

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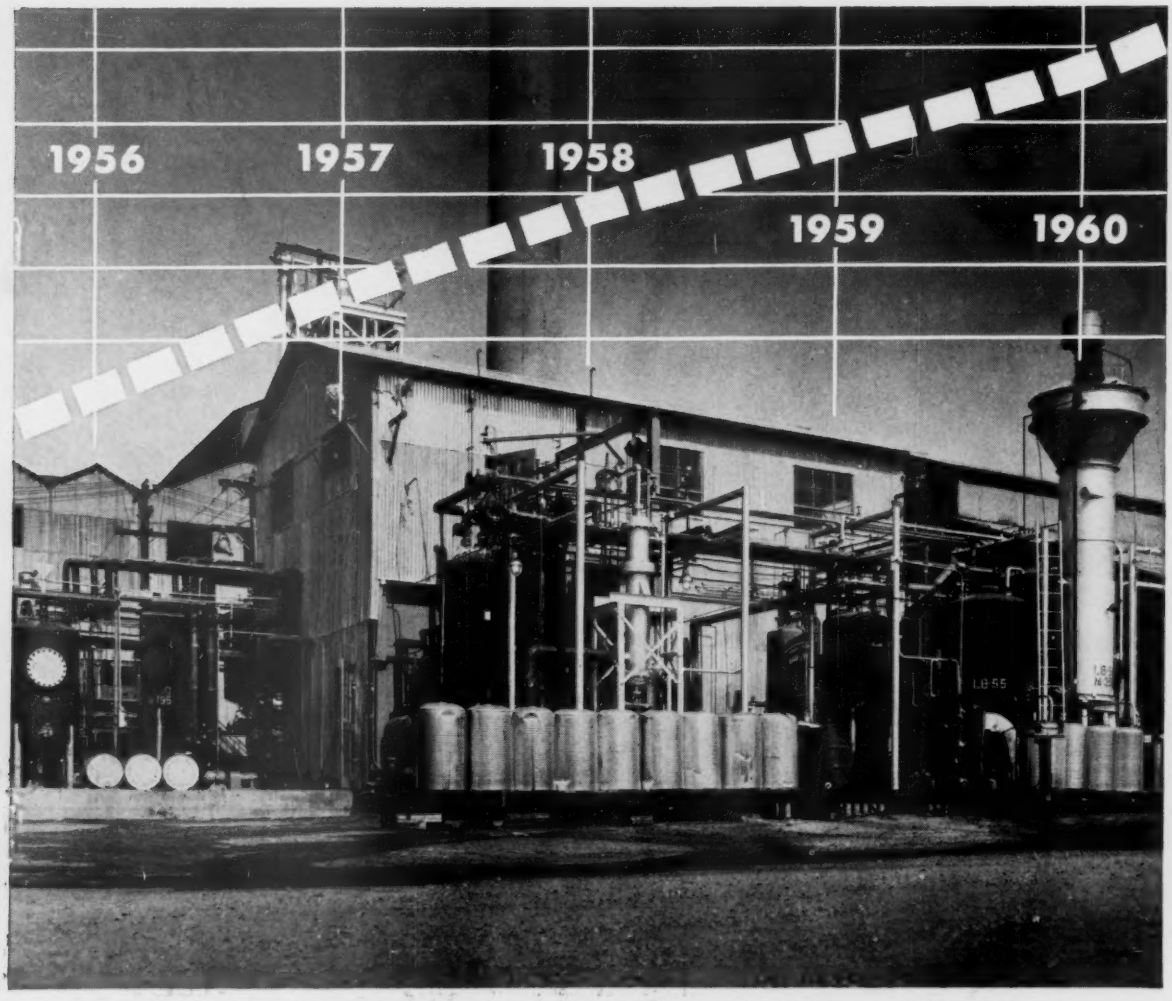

LOOKING AHEAD—This pilot plant is typical of Hercules facilities devoted to the development of new products for the rubber industry. Chart of future rubber consumption is projected on the basis of government statistics.

Hercules Facilities Keep Pace with Rubber Industry's Growth

This new pilot plant at Hattiesburg, Mississippi helps pave the way for new and improved rubber chemicals for tomorrow.

Hercules has pioneered in the development of Dresinate® rosin soap emulsifiers, and other products such as hydroperoxide catalysts and brick defoamers. New materials, the result of continuing research by Hercules, are now being readied for commercial production.

For further information on Hercules products for the rubber industry, write:

Rubber Chemicals Division
PMC Department

HERCULES POWDER COMPANY
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PR56-1

...an expanding symbol of quality and service in synthetic rubber!

Current Polymers

Cold	**Class**
ASRC 1500	Staining
ASRC 1502	Non-staining
Cold Oil	
ASRC 1703	Non-staining
ASRC 1708	Non-staining
Hot	
ASRC 1000	Staining
ASRC 1001	Slightly staining
ASRC 1004	Staining
ASRC 1006	Non-staining

AMERICAN SYNTHETIC RUBBER CORPORATION

Plant and General Offices: Louisville, Kentucky • Executive and Sales Offices: 500 5th Ave., New York 36, N. Y.
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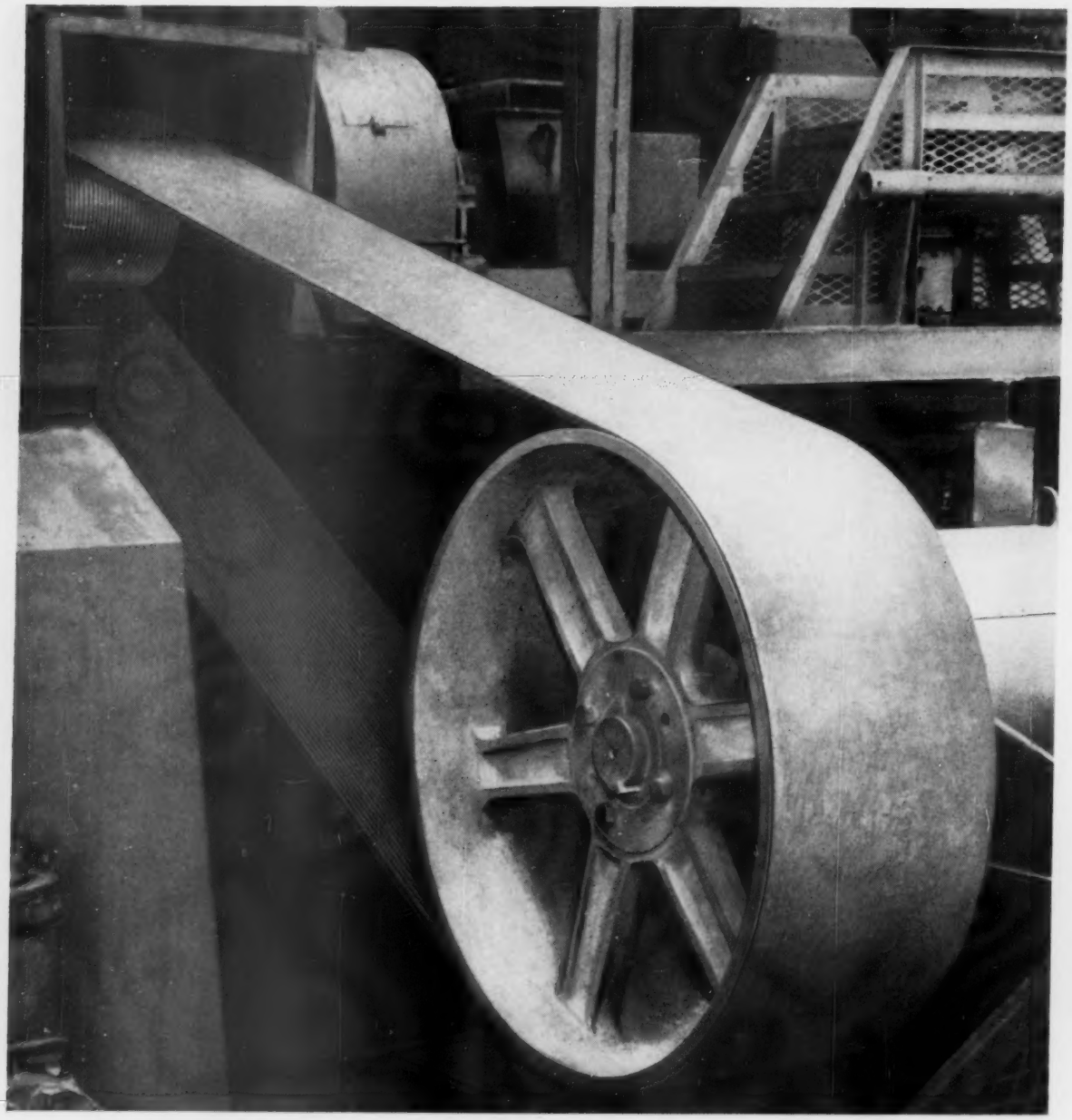

A GRIPPING SITUATION – This unique, multi-ribbed Poly-V® Belt drives a 900 HP oil field pump for a West Texas drilling rig. Manufactured by Raybestos-Manhattan, Inc., its single-unit construction eliminates "matching" problems; provides excellent grip and positive tracking wherever heavy-duty power transmission is required. Because great lateral strength, crack-resistance and body are required in its manufacturing, Raybestos-Manhattan turned to Mount Vernon Mills, Inc. for a top cover fabric.

This is another example of how fabrics made by Mount Vernon Mills, Inc., and the industries they serve, are serving America. Mount Vernon Mills, Inc. engineers and its laboratory facilities are available to help you in the development of any new industrial fabric or in the application of those already available.

UNIFORMITY
Makes The Big
Difference
In Industrial Fabrics

Mount Vernon Mills, Inc.

A LEADER IN INDUSTRIAL TEXTILES

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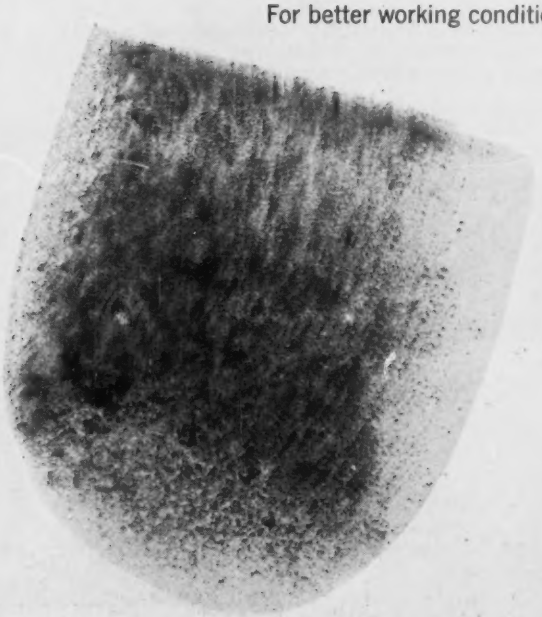
STAMP OUT your dusting problems with Cyanamid's DPG dustless and DOTG dustless!

For better working conditions specify these **dustless** accelerators:



DPG dustless—a primary accelerator in natural rubber and an activator for MBT, MBTS and other thiazole-type accelerators in all types of butadiene-styrene copolymer and natural rubber stocks.

DOTG dustless—the strongest of guanidine accelerators. Excellent with MBT and MBTS in all types of GR-S and natural rubber stocks for making heels, soles, footwear, hard rubber and molded goods in general. DPG and DOTG are also available in regular grades.

Ask your Cyanamid representative for trial samples of these efficient rubber chemicals. Write for your copy of the new technical bulletin on the Guanidine Accelerators.

CYANAMID

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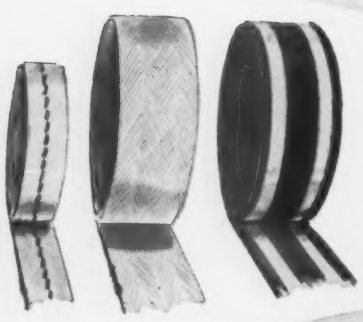
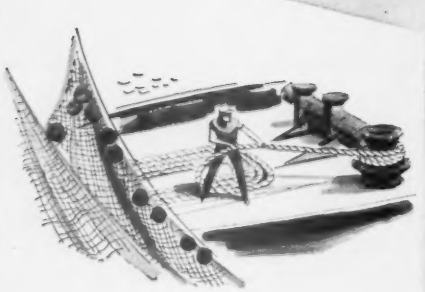
Conveyor Belts



Webbing



Rope

Allied Chemical's

caprolan®

tensile-tough nylon

NYLON HEAVY YARNS

OFFER UNUSUAL TOUGHNESS AND LONG FLEX LIFE IN HEAVY-DUTY INDUSTRIAL FABRICS

Caprolan *tensile-tough* nylon heavy yarns (2000 denier and up) are a completely new yarn class that assures unusual durability and economical performance in such industrial products as duck, webbing, rope and similar constructions.

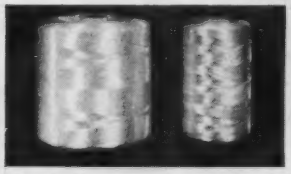
For heavy-duty applications, this new kind of nylon combines toughness, high impact strength, abrasion resistance, long flex life, and — for conveyor belts — excellent troughing qualities.

Where color is desired in nylon, Caprolan also offers a previously unavailable affinity for virtually any class of dyestuff, and can provide quality color rendition of dyes in shorter dye cycles.

Caprolan nylon heavy yarns eliminate the need to ply multiple ends of finer deniers to achieve a higher total effect. They can be engineered as high as 50,000 total denier, according to your specifications, and are put up on a new 30-lb. package as well as on 10-lb. packages.

You will want to look into such Caprolan economies as longer runs between creelings . . . ready dyeability . . . elimination of costly fine denier inventories . . . and the unusual and lasting whiteness of Caprolan that develops no appreciable yellowing in storage.

Caprolan heavy yarns already have been established in many leading mills. For more information or technical assistance, call or write us today.



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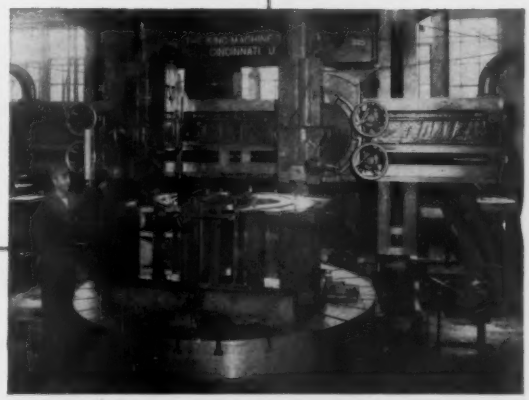
SECO
ESTABLISHED 1868

* S.C.S. means Skinner Certified Service. One important factor in the rebuilding of Banbury Mixers is the proper equipment to do what needs to be done, with dispatch and precision. Expert craftsmen use the most improved machine tools for turning, boring, milling, and other necessary operations. Searching inspection and rigid testing are routine procedures throughout the rebuilding job.



Re-cutting registers and restoring standard length dimension for No. 11 spray sides on 120-in. King Vertical Mill. This is one of the large heavy duty machine tools in the SKINNER plant used in rebuilding Banbury Mixers.

A few POINTERS ON S. C. S.

- All rebuildable parts of dismantled body are checked for hidden imperfections, for standard dimensions and distortion.
- Sides are bored out, and 2-in. liners of customer's choice installed.
- Rotors are completely stripped of hard-surfacing materials, and bodies rebuilt to proper contour. Entire rotor, inclusive of threads, is rebuilt, body hard surfaced, stress relieved, and restored to standard dimensions.
- Sliding door, dust seal rings, and body fit bolts are always provided new.
- All parts are carefully examined by skilled technicians and magnafluxed.

SKINNER · ENGINE · COMPANY

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RUBBER MACHINERY DIVISION
TELEPHONE ERIE 2-3661
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modern protection based on WELKOTE

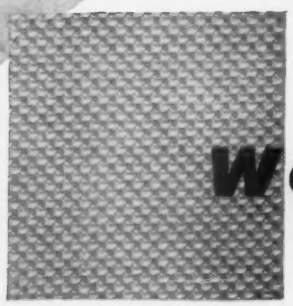
This 10′ x 14′ Welkote-based tarp is an easy load for one man.

Welkote is at the very heart of the big change in protective coverings. On trucks and railroads, on playing fields, construction sites and oil fields . . . wherever dependable, lightweight protection is needed, you find more and more tarpaulins, tents and covers based on this Wellington Sears base fabric for neoprene and vinyl coatings.

Tough filament nylon Welkote teams up perfectly with vinyl and neoprene because it was specifically engineered for them. The finished Welkote-based product, when properly coated and fabricated, is amazingly light, yet strong beyond belief. Its remarkable tear strength and resistance to water, wear and weather, are already setting new long-term economy standards in many industries. Further, Welkote-based materials are easier to transport and handle (see picture above).

Welkote is widely specified by coaters. Supplied by Wellington Sears in three basic weights, it is one of many fabrics we engineer for the coating industry—and one of a long list provided to all industries for over a century. This extensive experience is yours to work with in all our base fabrics, available for every coating use at Wellington Sears.

For illustrated booklet, write Dept. G-9



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For Mechanical Goods, Coated Materials, Tires, Footwear and Other Rubber Products

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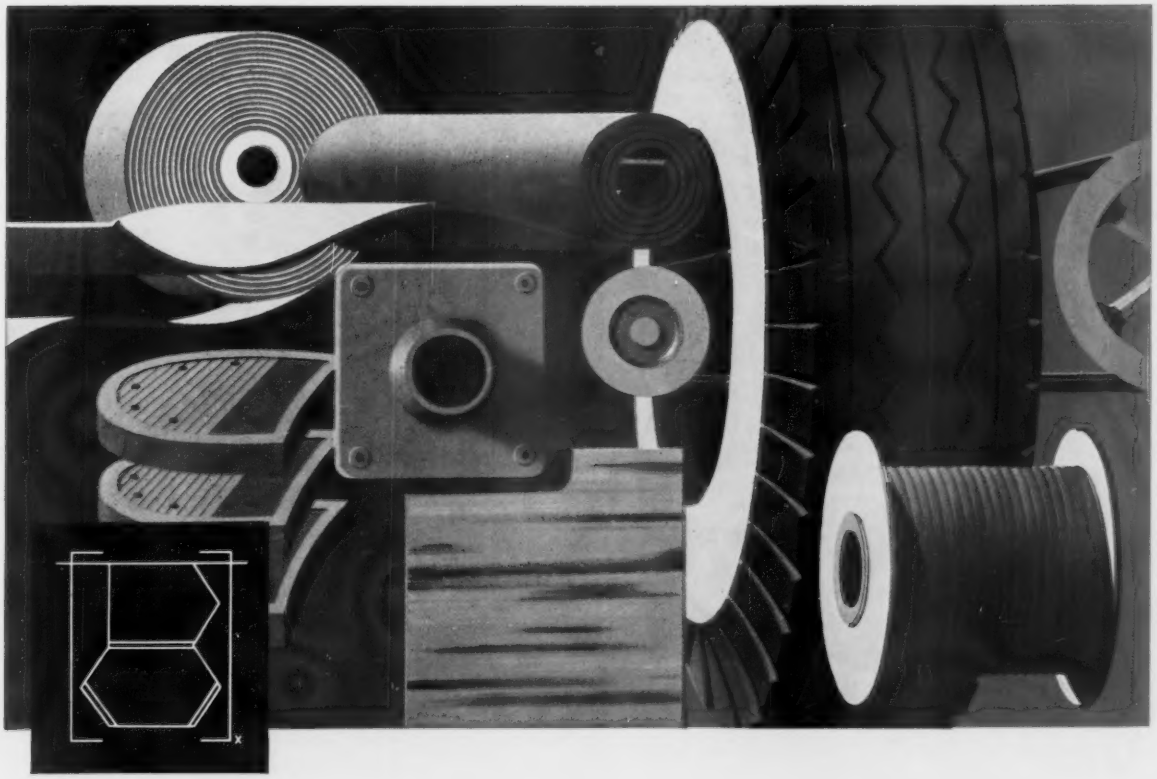

Raise Quality and Lower Costs With Neville Coumarone-Indene Resins

Coumarone-indene resins by Neville have become standard in the processing of rubber for an ever-increasing variety of products in ever-greater volume throughout the years. Here's why. Users find that Neville gives them constant good quality and fast service, and they save production time and costs and produce better products when they use coumarone resins. Also, Neville has a broad variety of these ideal extender-plasticizers in various grades and melting points to suit every product need. Our chemists will gladly assist yours in selecting the proper one for your purpose. Use the coupon to write for further information.

Neville Chemical Company, Pittsburgh 25, Pa.

Resins—Coumarone-Indene, Heat Reactive, Phenol Modified Coumarone-Indene, Petroleum, Alkylated Phenol • **Oils**—Shingle Stain, Neutral, Plasticizing, Rubber Reclaiming • **Solvents**—2-50 W Hi-Flash, Wire Enamel Thinners.

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is *ideal* for separating lightweight stocks

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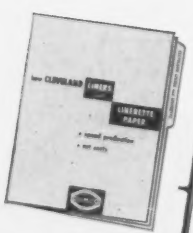

ILLUSTRATED LINER BOOKLET
Tells all about Climco Liners and Linerette and how to get better service from liners. Write for your copy now.

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Treatment Contains
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PROCESSED LINERS
Serving the Industry Since 1921

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means *uniformity* in **cold** rubber

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means *well-packaged* cold rubber

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and . . . means *high quality* cold rubber

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Yes, even rubber "grows" in the West now . . . at Shell Chemical's rubber "plantation" in Torrance, California. This modern plant, one of the best equipped in the nation, produces a full line of butadiene-styrene type synthetic rubber to fill the needs of large and small Western manufacturers.

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Synthetic Rubber Sales Division
P. O. Box 216, Torrance, California

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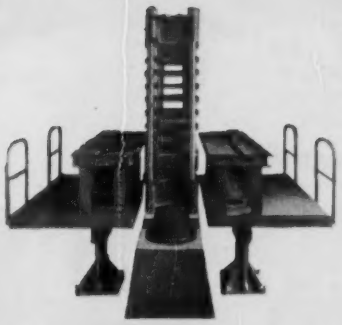

192-ton Multiple Opening Platen Press. Designed for molding rubber products. This press may be operated from an individual self-contained pumping unit or a central accumulator system. Two elevators operate with two presses working side by side. Write for catalog and engineering information on this and other R. D. Wood hydraulic presses for rubber, plastics, metalworking, and woodworking—without obligation.

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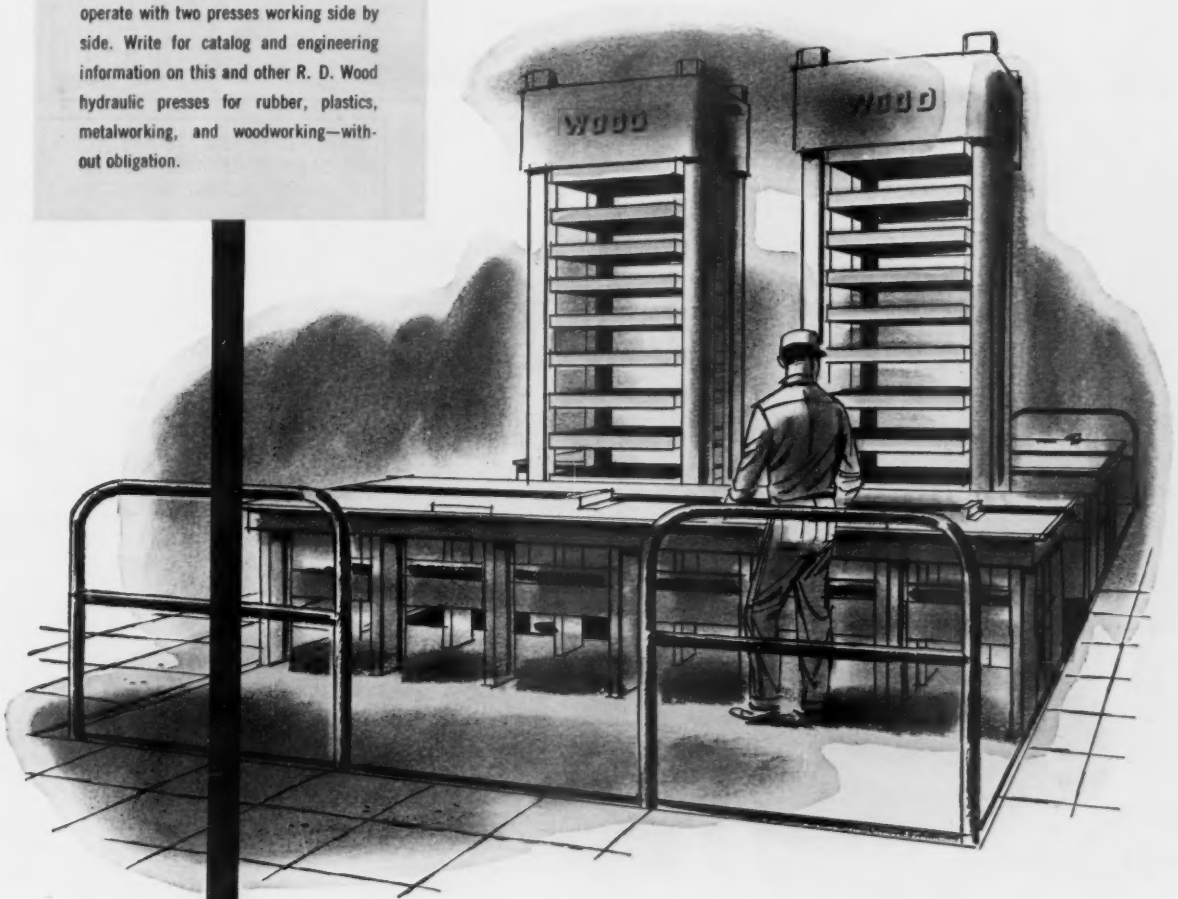

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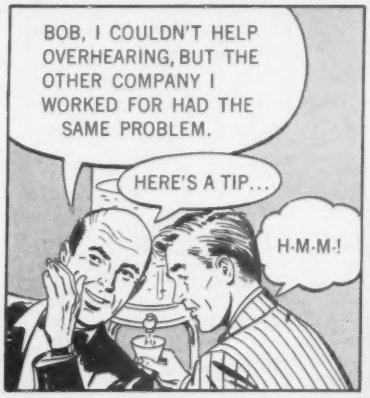
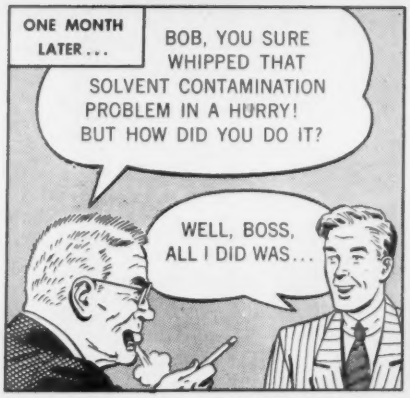
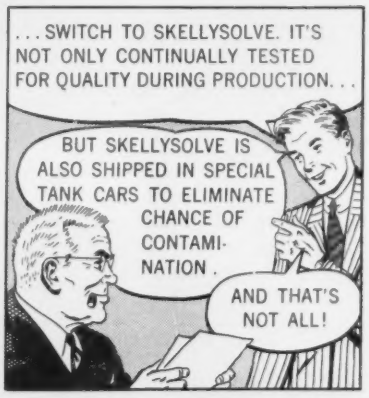
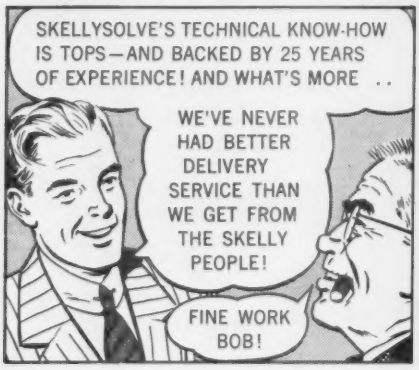
The Case of The
Violent Veep
WHAT ON EARTH IS BOTHERING THE BOSS THIS MORNING?
HE'S JUST DISCOVERED THAT CONTAMINATED SOLVENTS ARE THE REASON FOR OUR PRODUCTION COSTS BEING OUT OF LINE!
POOR BOB!

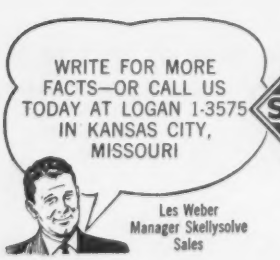



ONE MONTH LATER...
BOB, YOU SURE WHIPPED THAT SOLVENT CONTAMINATION PROBLEM IN A HURRY! BUT HOW DID YOU DO IT?
WELL, BOSS, ALL I DID WAS...


...SWITCH TO SKELLYSOLVE. IT'S NOT ONLY CONTINUALLY TESTED FOR QUALITY DURING PRODUCTION...
BUT SKELLYSOLVE IS ALSO SHIPPED IN SPECIAL TANK CARS TO ELIMINATE CHANCE OF CONTAMINATION.
AND THAT'S NOT ALL!


SKELLYSOLVE'S TECHNICAL KNOW-HOW IS TOPS—AND BACKED BY 25 YEARS OF EXPERIENCE! AND WHAT'S MORE ..
WE'VE NEVER HAD BETTER DELIVERY SERVICE THAN WE GET FROM THE SKELLY PEOPLE!
FINE WORK BOB!

Discover what Skellysolve quality and service can mean to *your* business.



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SKELLY OIL COMPANY

Industrial Division

605 West 47th Street, Kansas City 41, Mo.

Skellysolve for Rubber and Related Industries

APPLICATIONS

SKELLYSOLVE-B. For making quick-setting cements for the shoe, tape, container, tire and other industries. Quick-drying, with no foreign taste or odor in dried compound. Closed cup flash point about -25°F.

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Rigid quality control is a key factor in Witco-Continental's 5 modern carbon black manufacturing plants. Our job is to produce uniform products to meet your requirements.

Witco-Continental has developed its manufacturing and technical service facilities to serve the rubber industry better. Our advice and assistance are at your disposal. For help with your rubber black problems, call your nearest Witco office.

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Continex® SRF—Semi-Reinforcing
Continex SRF-NS—Non-Staining
Continex HMF—High Modulus
Continex HAF—High Abrasion
Continex FEF—Fast Extruding
Continex ISAF—Intermediate Super Abrasion
Continex CF—Conductive Furnace

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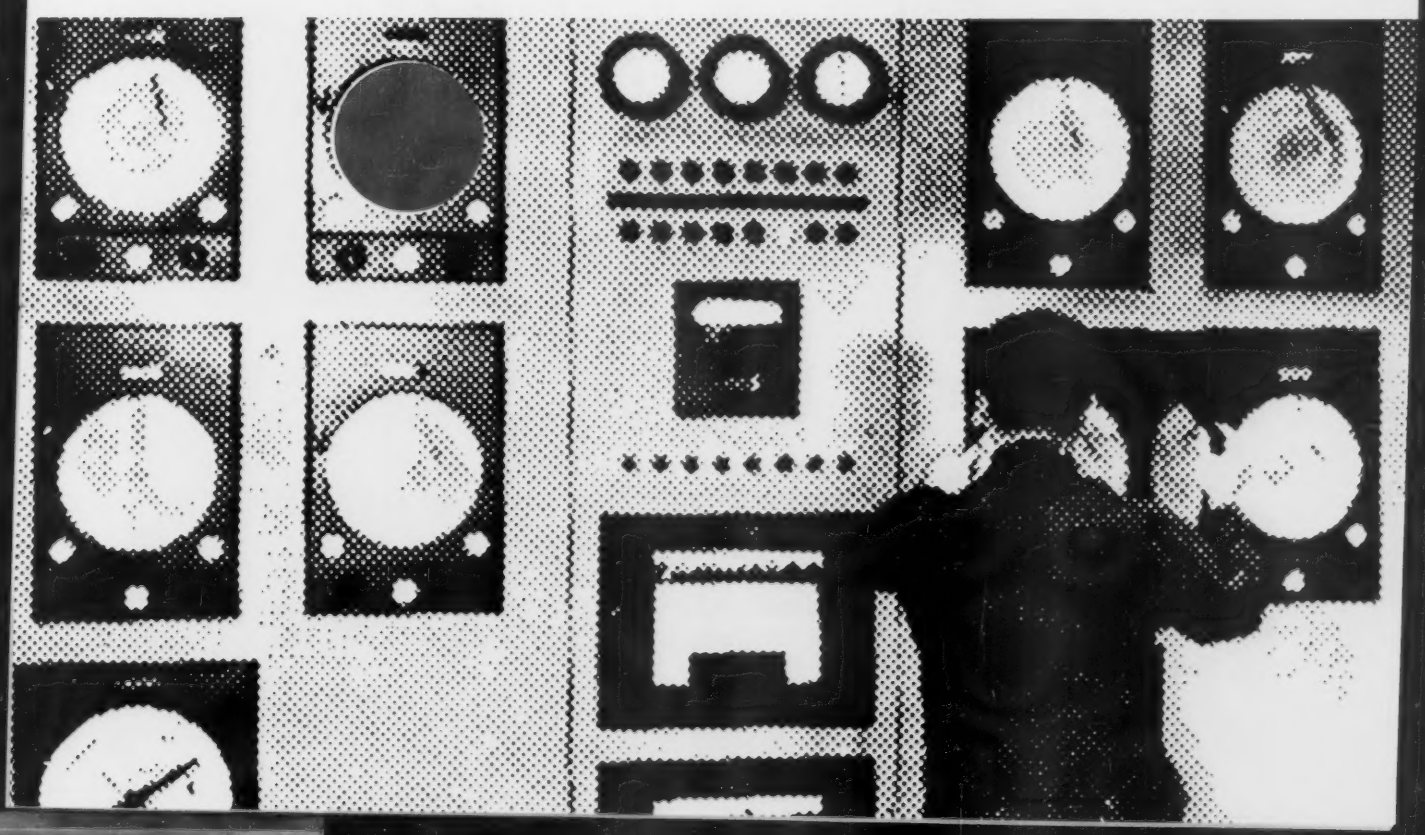

"Tumbling with Pureco liquid CO_2 eliminated die-trimming on several product lines...

and saves 3-4 hours in deflashing time", says P. W. Floeckher, Canfield Rubber Co., Bridgeport, Conn.

"Previously we would first die trim rubber parts and then finish tumble them in a barrel with Pureco "DRY-ICE". Results were good, but required time to complete. Recently we experimented with Pureco liquid CO_2. The results far surpassed our expectations. Parts which used to be die trimmed in 3 to 4 hours can now be fully trimmed in minutes.

"Quite naturally we cannot trim all our items in this manner. Nevertheless, we have found several where die trimming can be eliminated entirely."

Your Pureco man can help you discover how a "frozen" rubber tumbling technique can give you better results with savings in time, material and manpower. He can arrange for an actual demonstration in your plant. Or, he can take some of your "problem" parts to experts at the Pureco laboratories. You'll receive a confidential report on the tumbling technique that will do the best job for you.

Either way, there's no cost or obligation. Call in your Pureco man as soon as possible!

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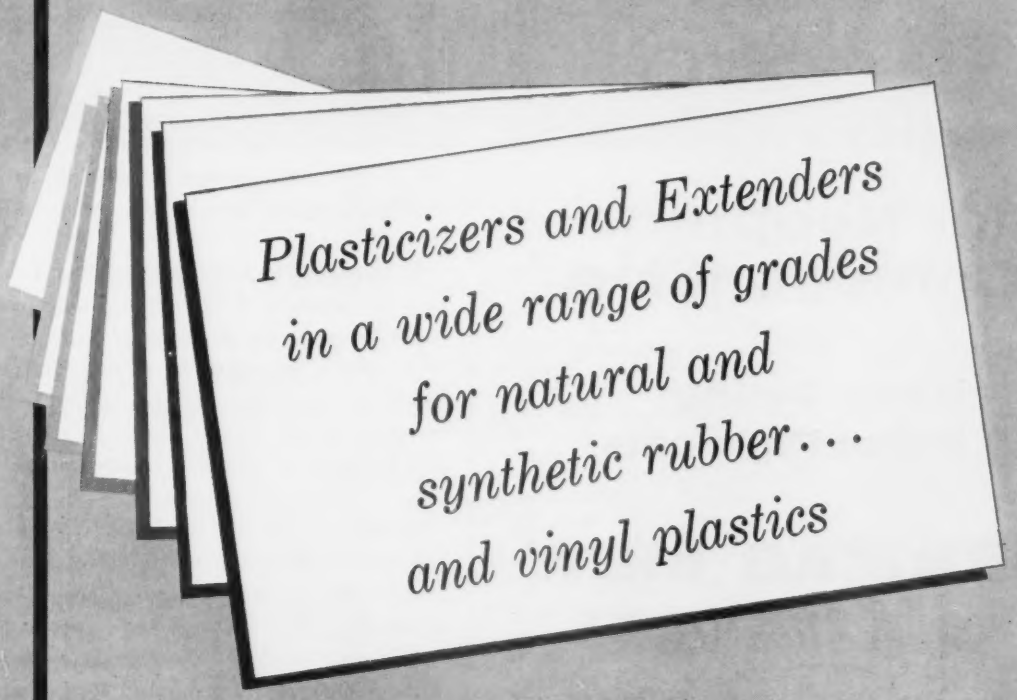
PURE CARBONIC COMPANY is a division of **AIR REDUCTION COMPANY, INCORPORATED** • Principal products of other divisions include: **AIRCO** — industrial gases, welding and cutting equipment and acetylenic chemicals • **OHIO** — medical gases and hospital equipment • **NATIONAL CARBIDE** — pipeline acetylene and calcium carbide • **COLTON** — polyvinyl acetates, alcohols and other synthetic resins.

SHELL DUTREX



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for Neoprene Compounding

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Magnesium Oxide

Bulk Density	18-22 Lbs.
Moisture	Nil
MGO (Ignited Basis)	97.9%
Chlorides	Nil
Manganese	.0003%
Activity	Moderate

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& MAGNESIA COMPANY

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Institution of the Rubber Industry

LONDON

The I.R.I., which was founded in 1921, is now a great association of people engaged in all branches of the Rubber Industry. Its members include rubber producers, manufacturers, scientists, technologists, executives, students and others, in many countries of the world.

It has reached its present position of authority and respect through the high standard it has set for the technical literature it publishes, the diplomas it awards, and the meetings and conferences it organizes.

In collaboration with other Societies, it aims to raise the standing of the Industry throughout the world by improving the technical qualifications of its personnel, extending the study of its raw materials, processes, and products, and by promoting the exchange of technical discovery and information by means of literature, conferences, and meetings.

Membership of the Institution is open to all interested at an annual subscription of $7.50 which entitles the member to receive the bi-monthly Transactions free of charge and to purchase other publications (such as the Annual Reports and Monographs) at reduced rates. It also serves to put him in touch with his colleagues and their work in other parts of the world and confers on him full rights to vote, to nomination for election to the Council and to participate in meetings and Conferences organized by the Institution.

Complete details are easily obtained by writing to:

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INSTITUTION OF THE RUBBER INDUSTRY
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FOR RUBBER PRODUCTS NEEDING THESE PROPERTIES

- Bright and permanent non-staining colors
- Extreme resistance to wear, weather and moisture
- Controlled "blow" in chemically blown stocks
- Exceptional dimensional stability

Use Synpol 1502

The butadiene-styrene copolymer 1502 has a long-standing reputation for excellence in the sole and heel, and tire industries.

Now with improvements made by TEXUS (Texas-U.S. Chemical Company) which include the use of a *new non-staining* stabilizer, SYNPOL 1502 may be used for products requiring bright, stable colors. In the making of white or brightly colored food conveyor belts, floor tiles, mats, electrical jacket stock, tires or lightweight chemically blown shoe soles the properties of SYNPOL 1502 are particularly applicable.

If you plan to produce a new product or improve your present line, write for processing data and compound formulations from your TEXUS technical sales representative.

Carload Pooled Shipments

Take advantage of carload discounts by pooling all your requirements from SYNPOL grades and types—the broadest available line of butadiene-styrene type rubbers which includes: 1000, 1001, 1002, 1006, 1007, 1009, 1012, 1013, 1061, 1500, 1502, 1551, 1703, 1707, 1708 and 1711.

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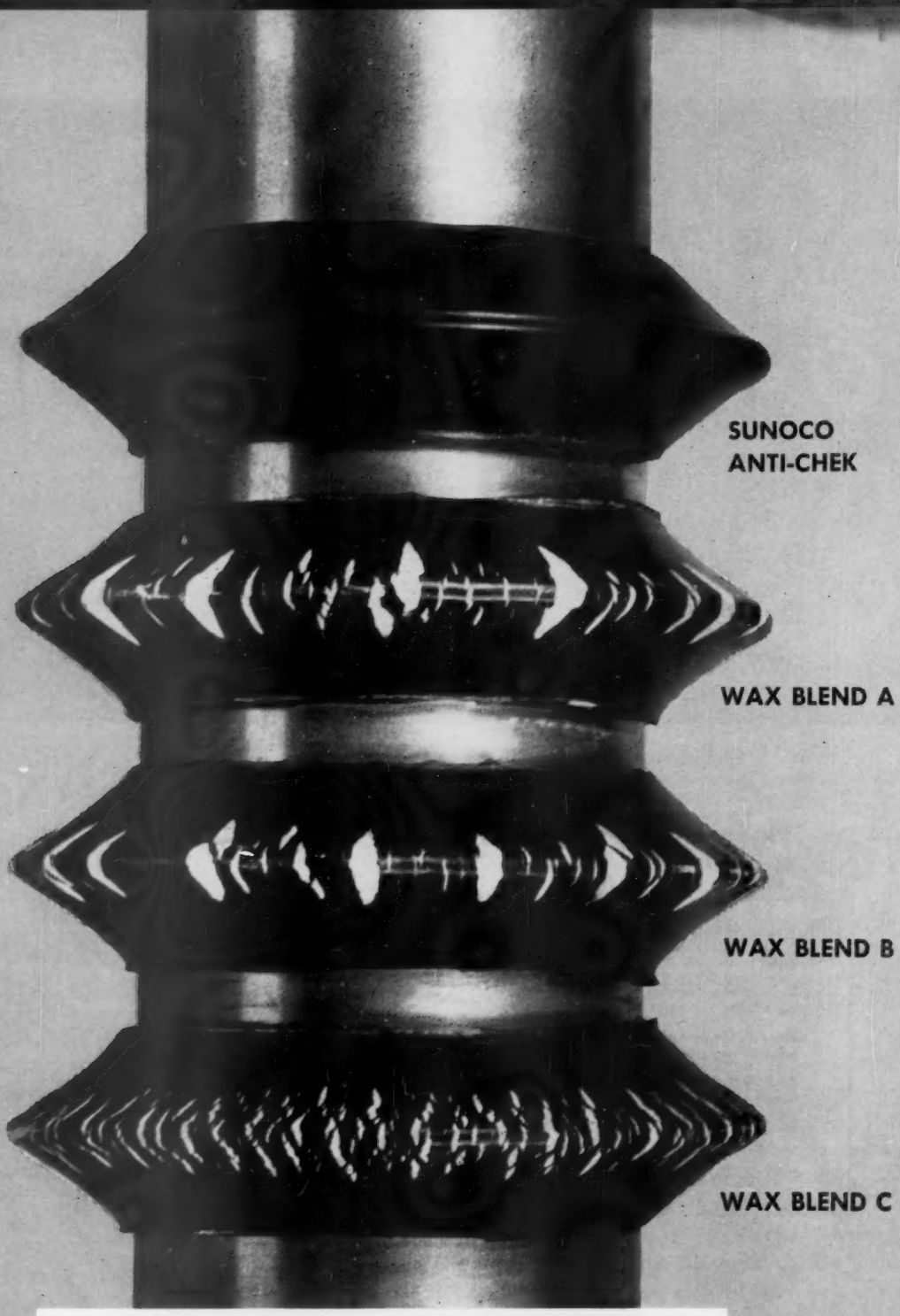
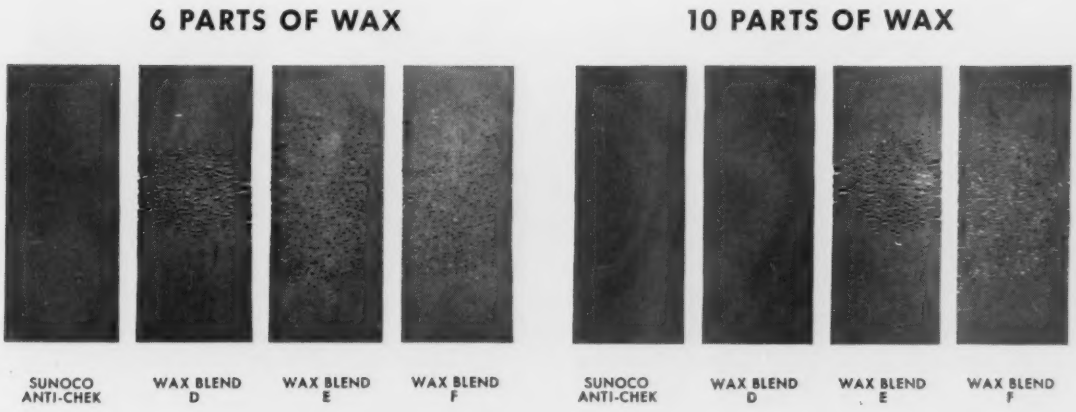


STANDARD A.S.T.M. OZONATOR TEST run for 100 hours proves Sunoco Anti-Chek® superior to ordinary wax blends. These stocks were tested in accordance with the method outlined in A.S.T.M.'s "Method of Test For Accelerated Ozone Cracking of Vulcanized Rubber" (Designation: D 1149-51T). Brushed on talc brings out defects. Note lack of checking and cracking in stock containing Sunoco Anti-Chek. Samples containing ordinary wax blends show varying degrees of deterioration.



LESS SUNOCO ANTI-CHEK NEEDED. These rubber test specimens show that *less* Sunoco Anti-Chek is needed to give *better* protection than you get with ordinary anti-checking wax blends. Ozonator and weathering tests prove that six parts of Sunoco Anti-Chek give equal or better protection than 10 parts of wax blends D, E and F.

Sunoco Anti-Chek Gives More Protection Against Cracking . . . Checking

After rigorous testing, Sun's researchers found that a special wax, Sunoco Anti-Chek, tailor-made for rubber, gave far greater protection than *ordinary* paraffin-microcrystalline blends that form brittle and much-too-thick films.

The rate of bloom determines how long an anti-checking wax protects rubber. Ordinary wax blends bloom too quickly and protection is short-lived. Sunoco Anti-Chek blooms at just the right rate to assure adequate long-life protection. In other words, to get protection for a given time, you need *less* Sunoco Anti-Chek.

For further information on Sunoco Anti-Chek, see your Sun representative or write for Technical Bulletin 30, SUN OIL COMPANY, Philadelphia 3, Pa., Dept. RA-9.

ASK FOR THIS FREE TECHNICAL LITERATURE

- Sun Rubber Process Aids (set of three bulletins describing product qualities of Circosol-2XH, Sundex-41, Sundex-53).
- Sunoco Anti-chek wax: Bulletin 30.
- An Ozonator for Accelerated Testing of Rubber: Bulletin 36.
- A Method for Classifying Oils Used in Oil-Extended Rubbers.

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SUN OIL COMPANY

Philadelphia 3, Pa.

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TENACITY of over 8.0 grams per denier (more than 160,000 psi), modulus of 5 million, and only 6% elongation pay off for you in all high-pressure hose—braided, wrapped, knitted or loomed.

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eliminate them with

KO-BLEND*

"Freckles" caused by sulfur bloom on light-colored stock are the plague of every production department. The addition of KO-BLEND® to your rubber formulations eliminates that problem. With today's tremendous demand for white and pastel stock in whitewalls, housewares, toys, shoe soles and a multitude of new applications, the need is greater than ever for proven sulfur bloom control.

KO-BLEND stops costly sulfur bloom in uncured stock, and pays for itself many times over by reducing rejects, thus speeding production. If you're turning out any light-colored stock, you need KO-BLEND. Write today for samples, literature and technical assistance.

THE GENERAL TIRE & RUBBER COMPANY
Chemical Division, Akron, Ohio

*KO-BLEND is a latex-compounded masterbatch of 50% 85% insoluble sulfur and 50% GRS-type rubber.

Chemical Division GENERAL
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New Room for Production... with Dow Corning Silicone Mold Lubricants

"We never clean molds except when we take them out for change or repair."

This statement by one of the world's leading rubber companies is strong testimony to the economies produced by Dow Corning silicone mold lubricants.

But that's what Inspector Mike and Moe Muscles have been saying for years—*standardize* on Dow Corning silicone mold lubricants and save the space and time you now devote to expensive mold cleaning operations. In addition to cutting your mold maintenance 80% to 100%, Dow Corning silicone mold lubricants give you faster, easier release; reduce rejects to the vanishing point; impart sharper detail and finer surface finish to your molded parts. There's no question but what it pays to *standardize* on Dow Corning silicone mold lubricants.

Open the door to new production efficiency, economy, and cleanliness in your plant . . . with Dow Corning Silicone mold lubricants.

FREE TRIAL
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☐ Booklet on silicone mold lubricants
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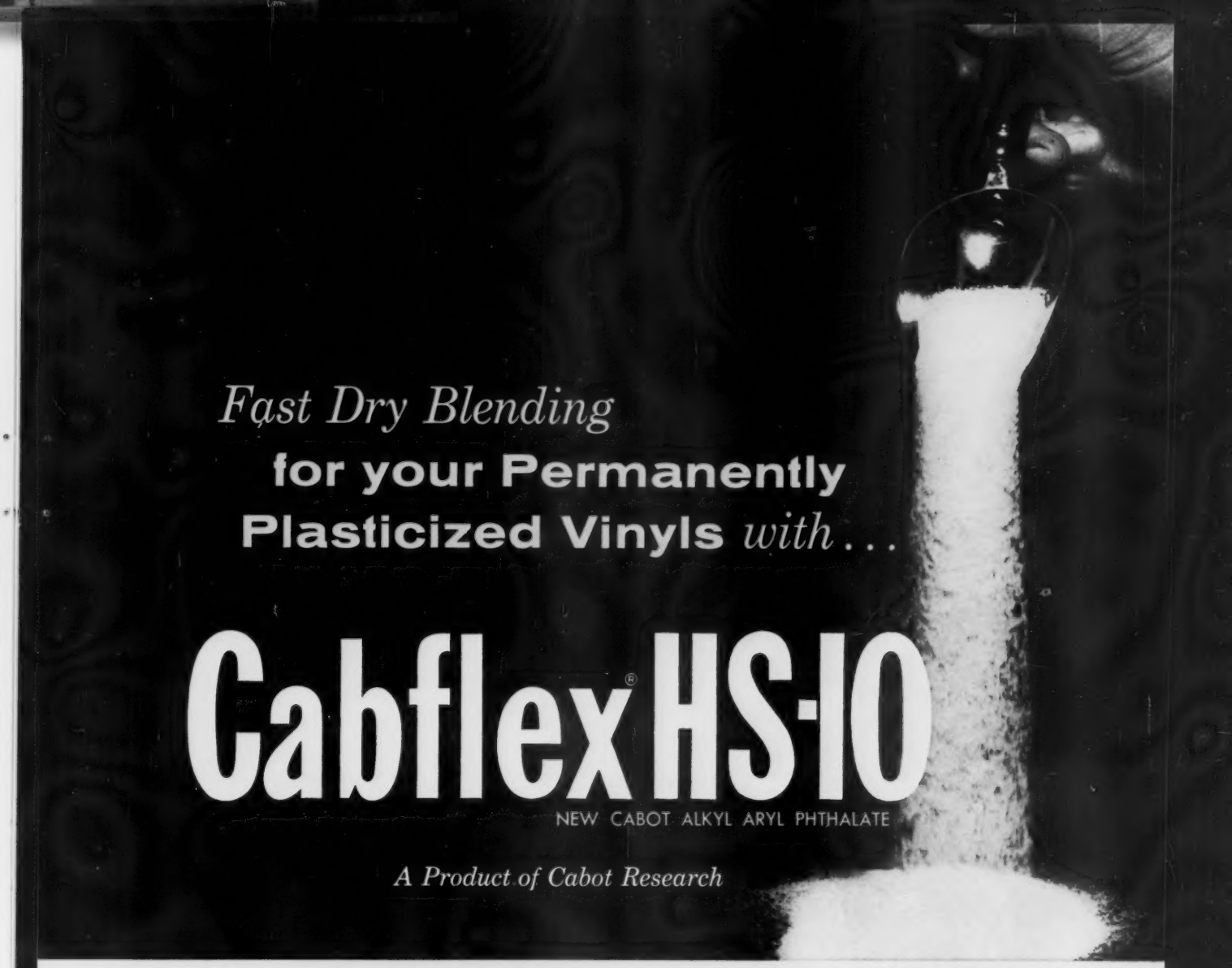

Fast Dry Blending
for your Permanently Plasticized Vinyls *with . . .*

Cabflex® HS-10

NEW CABOT ALKYL ARYL PHTHALATE

A Product of Cabot Research

Dry blends of Cabflex HS-10, unlike those of polymeric plasticizers, are made quickly and easily, resulting in a free-flowing powder. Cabflex HS-10 is a unique low volatility phthalate plasticizer with amazing stability and permanence.

PLASTICIZER USED	HS-10	TYPICAL POLYMERIC PLASTICIZER
Viscosity of Plasticizer @ 20°C.	378 Cps.	3380 Cps.
Mixing Time	12 minutes	34 minutes
Condition of Powder Mix	Dry, Free Flowing	Non-Free Flowing
Color	White	Light Tan
PROPERTIES OF PLASTIC		
Volatility @ 90°C.—Weight Loss %[1]	0.99	0.95
Water Extraction @ 85°C.—Weight Loss %[2]	1.9	5.6
Soapy Water Extraction—Weight Loss %[3]	2.2	4.4
Oil Extraction—Weight Loss %[4]	1.2	1.1
Migration into Lacquer	Nil	Nil

(1) ASTM-DI203-52T
(2) Method of E. F. Schulz
(3) Immersed 24 hours @ 60°C. in 1% Ivory Soap Solution
(4) Immersed 10 days in Atreol #9 @ 23°C.

CHECK THESE ADVANTAGES OF CABFLEX HS-10:

- Volatility ½ that of di-iso-decyl phthalate
- Requires no antioxidant
- Outstanding insulation resistance in electrical vinyl compounds—13,000 megohms/1000 ft. @ 15.6°C.
- Excellent resistance to extraction by gasoline, oil and water
- Low rate of migration
- Greatly improves processing characteristics while maintaining the permanence of plasticizer systems in blends with polymeric plasticizers

Write for **FREE SAMPLES** *and* **TECHNICAL LITERATURE**

CABOT® PLASTICS CHEMICALS DIVISION

GODFREY L. CABOT, INC.
77 Franklin St., Boston 10, Mass.

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it's
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Rutile types of TITANOX white titanium dioxide pigments are universally acceptable for most types of plastics—whether extruded, molded, sheet, or film-coated. For white and light tinted stocks, TITANOX-RA provides maximum whiteness, brightness and opacity. For heavily loaded stocks where the high opacity of "pure" titanium dioxide is not needed, TITANOX-RCHT or TITANOX-C-50 may be used.

But whatever the use, no other whitening agent gives plastic products the color and sparkle—the eye-catching appearance—that TITANOX does. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; Atlanta 5; Boston 6; Chicago 3; Cleveland 15; Houston 2; Los Angeles 22; Philadelphia 3; Pittsburgh 12; Portland 14, Ore.; San Francisco 7. In Canada: Canadian Titanium Pigments Limited, Montreal 2; Toronto 1.

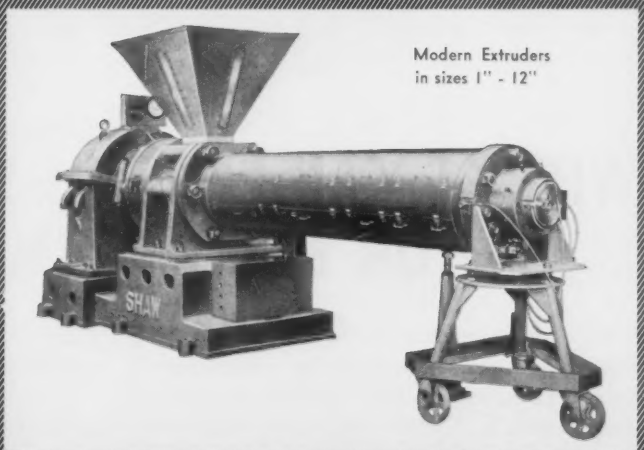
Titanium Pigment Corporation is a subsidiary of National Lead Company

3646-A

quality extrusions through controlled temperature zones

To produce quality extrusions without the risk of imperfection requires temperature control to a fine degree. These Shaw Extruders provide it exactly. There is all electric heating in separate zones and each zone is independently controlled by proportioning instruments.

Various screw and die designs are available for the production of piping, sheeting, miscellaneous sections, and the insulation and sheathing of cables, etc. Great attention has been paid to bearings and barrel support to avoid wear and vibration.



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WRITE FOR TECHNICAL BULLETIN I-12

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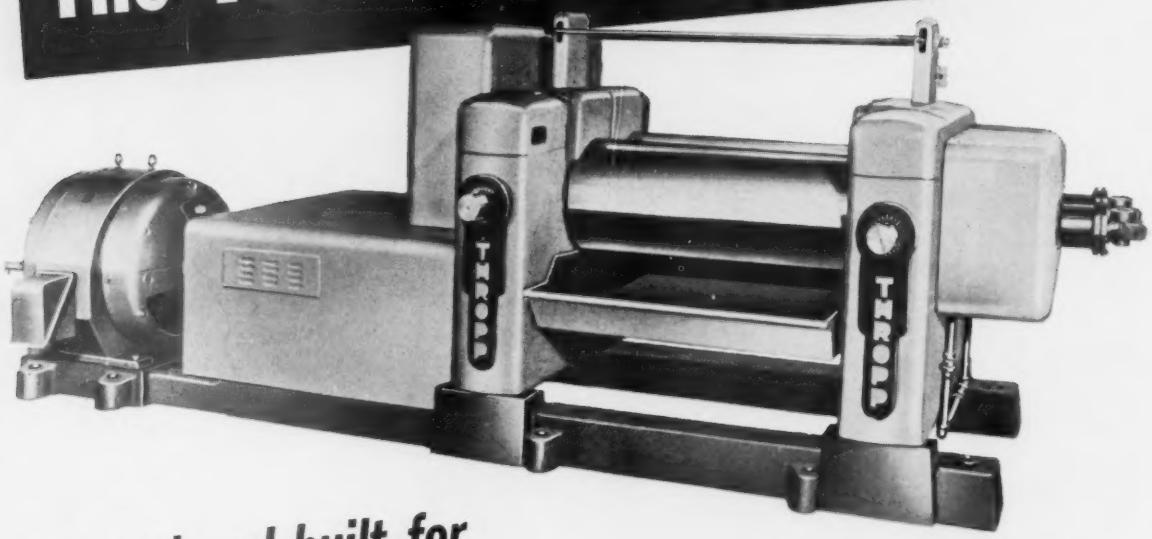

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COLD	PHILPRENE 1500 PHILPRENE 1502 PHILPRENE 1503	PHILPRENE 1601 PHILPRENE 1605—Philblack A cold rubber masterbatch
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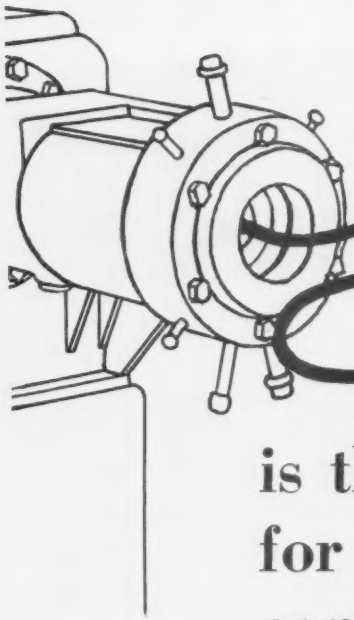

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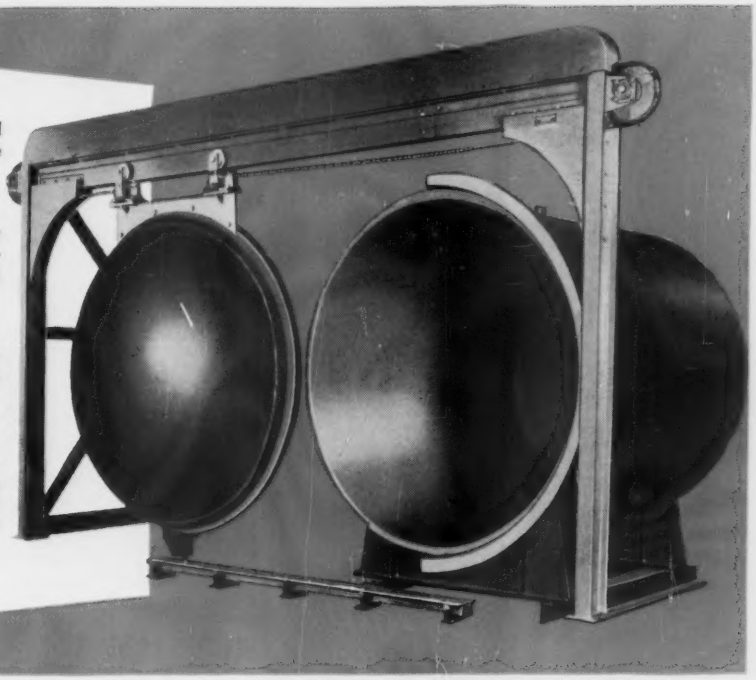

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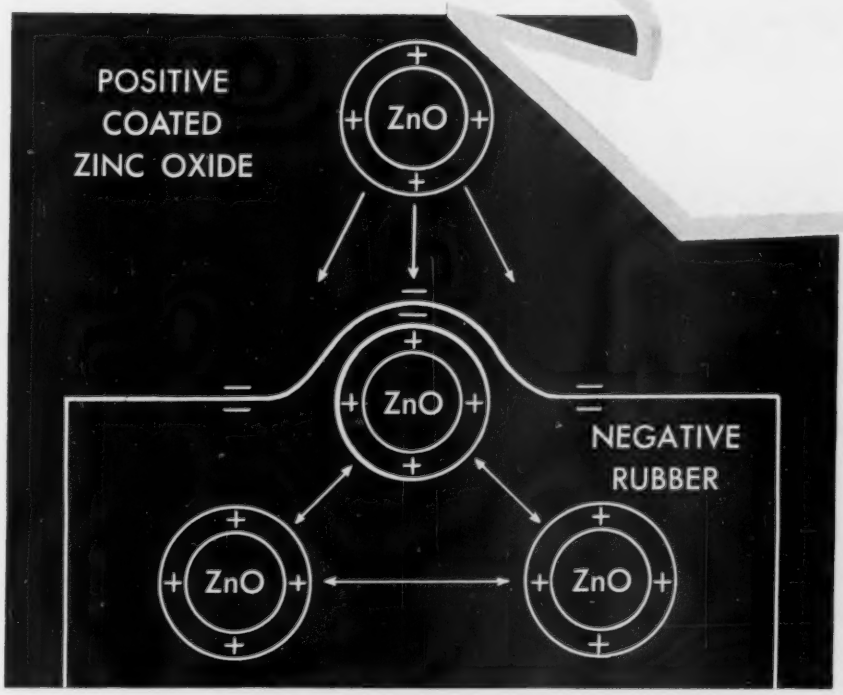
Coated ST. JOE Zinc Oxide provides better rubber processing



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Technically speaking the monomolecular film of hydrophobic high molecular weight organic ester in St. Joe's *coated* zinc oxide has a more positive charge than that of rubber. Rubber has a greater affinity for coated oxide than uncoated pigment. Practically speaking this property results in faster dispersion and uniform incorporation into the mix.

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check your esterifier. Get plasticizers manufactured from INDOIL Oxo Alcohols.

INDOIL plasticizer evaluation laboratory checks quality of INDOIL Alcohols by testing derived esters in finished vinyl compounds. Here operator prepares a vinyl compound.

Typical properties of esters prepared from INDOIL Oxo Alcohols

	DIOP	DDP	DIOA
Specific Gravity 20/20	0.981	0.965	0.928
Color, APHA	< 25	< 25	< 25
EMC* phr at 1,600 psi	51.4	53.7	43.6
Refr. Index n_D^{20}	1.486	1.484	1.447
Visc. cs at 20°C.	74	120	18
Temp. at 100,000 Stokes, Vis., °C.	–42	–39	–70

*Equivalent Modulus Concentration

For additional information, write for INDOIL Alcohol Bulletins Nos. 22 and 23.

Testing low temperature flexibility at INDOIL plastics evaluation laboratory.

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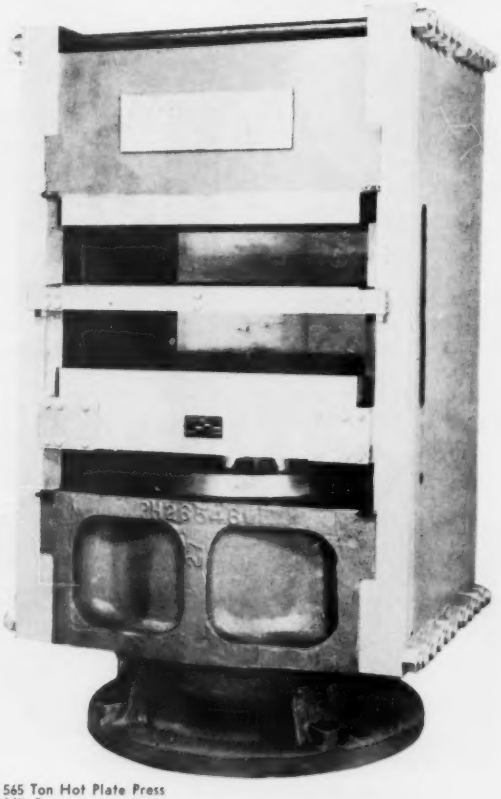

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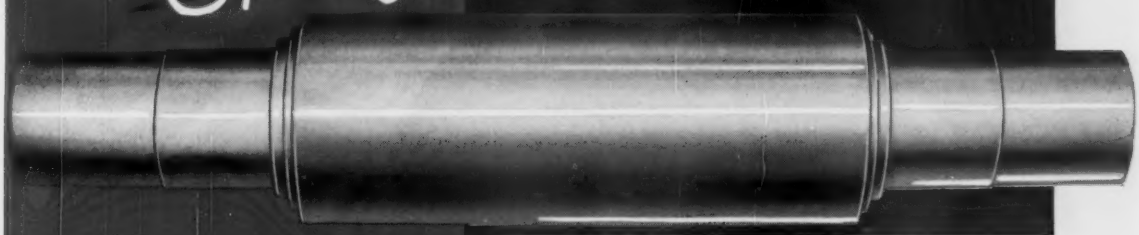

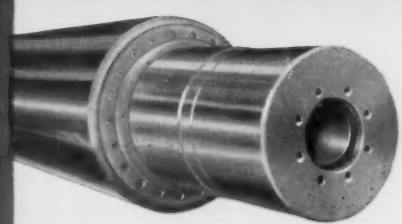

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Infrared Spectrophotometric Evaluation of Ozone-Induced Chemical Changes In Antiozonants for Elastomeric Compounds

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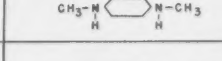
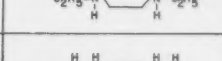
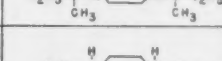
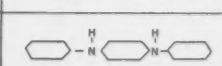
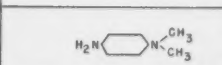
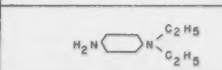
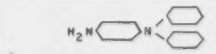
In this work, a phase of an investigative program to develop ozone-resistant elastomeric compounds, reactions between ozone and symmetrical and unsymmetrical derivatives of p-phenylenediamine are suggested. Infrared spectrophotometry was utilized to follow the ozone-induced changes in selected antiozonants. Curves are presented which show the progressive growth of absorption bands attributed to quinoid and nitro groups, and the simultaneous deterioration, during ozonization, of absorption bands characteristic of amine structures. These chemical changes are in agreement with, and tend to confirm, the postulated reactions. It is anticipated that this work will contribute to a better understanding of the functioning of ozone-protectant chemicals.

THE aging of polymeric materials by the action of heat, light and chemical agents has been the subject of many investigations *(6, 7)*. The mechanism of polymer degradation consists, in general, of concurrent aggregative processes such as polymerization, branching, cross-linking and cyclization and such disaggregative processes as chain scission and depolymerization. The action of atmospheric ozone on stressed elastomeric material is visible evidence of the degradative processes. Cracking of the polymer occurs at right angles to the direction of stress and ozone is generally accepted as the causative agent.

Recent efforts to improve the stability of elastomers have led to the development of chemical additives known as antiozonants which have demonstrated a highly

TABLE I - ANTIOZONANT CHEMICALS

Chemical	Structure	Raw Material Source
N,N'-dimethyl p-phenylenediamine		Eastman Kodak Rochester, N.Y.
N,N'-diethyl p-phenylenediamine		Chemical Procurement Co. N.Y.C.
N,N'-di-sec-butyl p-phenylenediamine		Eastman Chem. Products, Inc. Kingsport, Tenn.
N,N'-dioctyl p-phenylenediamine		Universal Oil Prod. Co. Des Plaines, Ill.
N,N'-diphenyl p-phenylenediamine		Chemical Procurement Co. N.Y.C.
N,N-dimethyl p-phenylenediamine		Eastman Kodak Rochester, N.Y.
N,N-diethyl p-phenylenediamine		Eastman Kodak Rochester, N.Y.
N,N-diphenyl P-phenylenediamine		Eastman Kodak Rochester, N.Y.

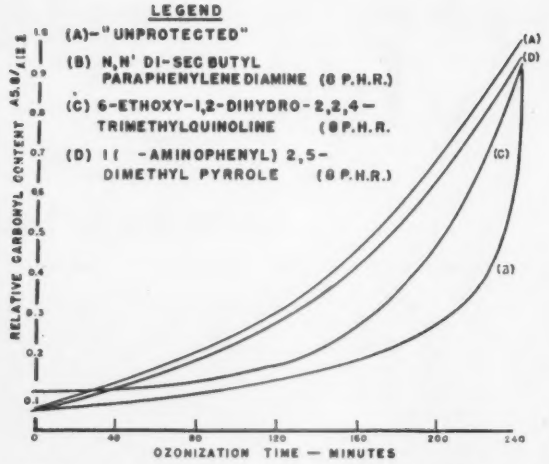


FIG. 1—Evaluation of antiozonants by infrared spectrophotometry. (O-Dichlorobenzene solutions of GR-S X-478).

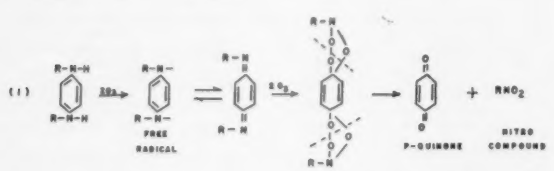
protective action on polymers subjected to ozone attack. The protective effects of such "inhibiting" chemicals have been demonstrated by viscosity measurements on polymer solutions undergoing ozonization *(4)*, by natural and accelerated weathering tests on vulcanizates *(3, 6)*, and by the techniques of infrared spectrophotometry *(1)*.

Infrared investigations permit large scale screening of potentially suitable compounds for antiozonant use. Figure 1, based on previous work *(5)*, shows the relative superiority, as an antiozonant, of N,N′-di-sec-butyl-p-phenylenediamine over the other antiozonant chemicals studied, based on the development of the carbonyl band in ozonized solutions of GR-S containing the respective inhibiting agents.

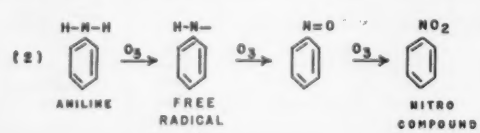
Since N,N′-di-2-naphthyl, N,N′-diphenyl and N,N′-dioctyl derivatives of p-phenylenediamine are being used commercially as antiozonants, the reactions between ozone and chemicals of this basic type, as presented in Table I, were selected for this preliminary study.

Theoretical Considerations

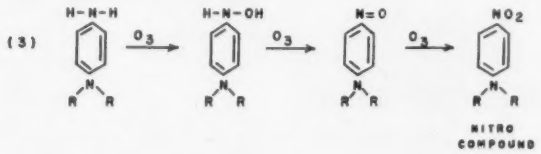
The literature reports *(2)* that four mols of ozone are required to completely oxidize one mol of any symmetrical substituted derivative of p-phenylenediamine containing saturated side chains. Accordingly, the following reaction is suggested:



No information is available at this time on the absorption of ozone by unsymmetrical derivatives of p-phenylenediamine. However, the work of Augustana *(2)* has indicated that aniline will absorb 3 mols of ozone, i.e.:



The following reaction is, therefore, suggested for the unsymmetrical derivatives of p-phenylenediamine, which are nominally p-tertiary amino derivatives of aniline:



The validity of equations (1) and (3) can be demonstrated by the observed ozone-induced infrared spectral changes.

Testing Procedure

Ozonization: The apparatus used to ozonize all solutions investigated was similar to that described by Allison and Stanley *(1)*. A 0.5% solution of the respective antiozonants in either chloroform or carbon tetrachloride was ozonized, at room temperature, using a stream of ozonized oxygen, containing 1500 p.p.m. ozone, flowing at a rate of 250 ml per minute. Aliquot portions of the ozonized solutions were removed for infrared spectrophotometric measurement, at preselected time intervals, and concentrated by evaporation to one-third their original volumes.

Infrared examination: Infrared spectrophotometric measurements, in the range of 2 to 11 microns, were made of the concentrated solutions with a Perkin-Elmer Model 21 double beam spectrophotometer, using a 0.005-inch liquid cell. A duplicate cell containing the solvent was used in the reference beam to compensate for its spectral absorption. Results of the infrared spectral measurements are graphically shown in Figures 2 to 4.

Effects of Oxygen: The effects of oxygen alone were determined by the ozonization procedure described above, using oxygen in lieu of the ozonized oxygen. Figure 2 shows the effects of oxygen on N,N-diethyl-p-phenylenediamine. These results indicate that under the experimental conditions of this investigation, oxygen alone does not react with the antiozonant. Similar results were obtained with the other antiozonants investigated.

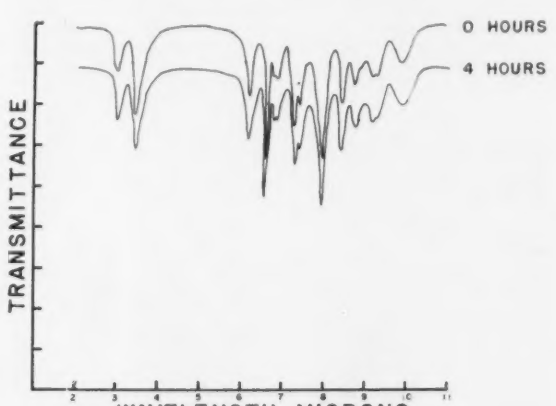


FIG. 2—Effects of oxygen on N,N-diethyl-p-phenylenediamine.

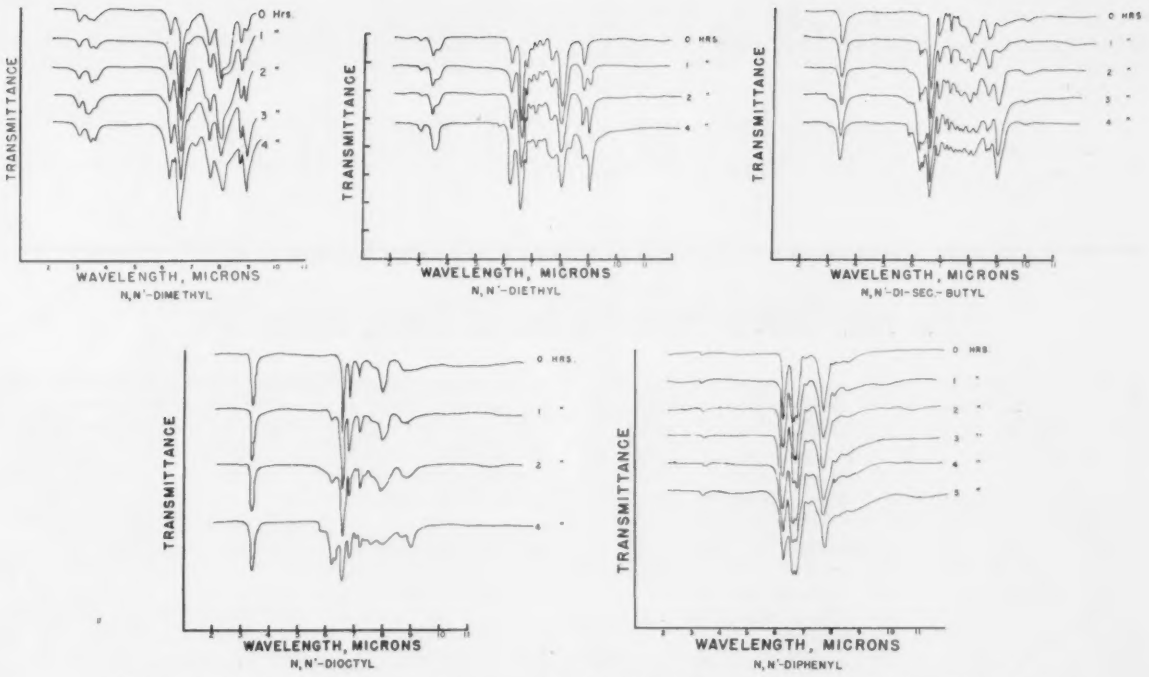


FIG. 3—Effects of ozone on the symmetrical p-phenylenediamine derivatives investigated.

Results and Discussion

Effects of ozone on the symmetrical p-phenylenediamine derivatives investigated are presented in Figure 3. This data shows the progressive development of absorption bands at 6.2 to 6.3, 7.4 to 7.7, and 9.0 microns. These changes are not apparent in the N,N′-diphenyl p-phenylenediamine due to the relative inactivity of this derivative under the experimental conditions of this investigation.

In addition to the spectral changes shown for the ozonization of the symmetrical p-phenylenediamine derivatives, the unsymmetrical derivatives show a progressive deterioration of the absorption band at 2.9 to 3.0 microns (Figure 4). Under the experimental conditions used, ozonization of the symmetrical derivatives does not exhibit this deterioration.

The development of the 6.2 microns absorption band, attributed to a quinone carbonyl or to nitro groups, indicates the formation of these compounds during the ozonization of p-phenylenediamine derivatives. Additional evidence of the formation of nitro groups on ozonization of these compounds is shown in the development of absorption bands at 7.4 to 7.7 and 9.0 microns. The decrease in absorption at 2.9 microns, attributed to the N-H stretching, indicates the degradation of the antiozonant. The development of quinone and nitro compounds, and the simultaneous degradation of the antiozonant, are in agreement with the reaction mechanisms suggested in equations (1) and (3), and therefore confirm their validity.

ACKNOWLEDGMENT AND SPECIAL NOTE

The authors are indebted to T. A. Werkenthin, Head of the Elastomers Branch, Bureau of Ships, Navy Department, Washington, D. C., for his interest and encouragement, and to Esther F. Goldberg for her invaluable technical assistance.

The opinions or assertions contained herein are those of the authors and are not to be construed as reflecting the views of the Navy Department or the Naval Services at large.

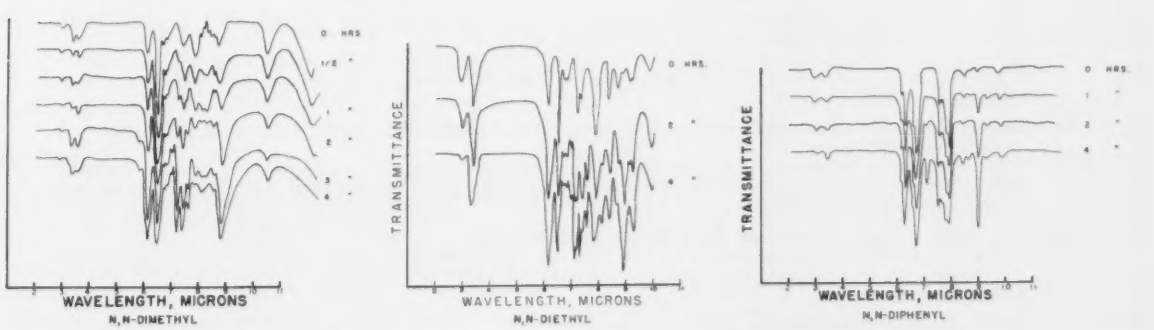


FIG. 4—Effects of ozone on the unsymmetrical p-phenylenediamine derivatives investigated.

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(3) Crabtree, J., and Kemp, A. R. *Anal. Chem.*, Vol. 12, pp. 769-74 (1946).
(4) Delman, A. D., Simms, B. B., and Allison, A. R., *Anal. Chem.*, Vol. 26, pp. 1589-92 (1954).
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Non-Toxic Chemical Proves Effective for Dousing Burning Tires

A FIRE extinguisher with a special chemical may help save truckers millions of dollars a year, according to tests conducted by the Pennsylvania Motor Truck Association. The tests, held in May of 1955, consisted of pairs of burning tires. Each set was allowed to burn for about nine minutes—until it was burning intensely inside and out—before applying the extinguishing agents.

The Karbaloy extinguisher, made by the Fyr-Fyter Company of Dayton, Ohio, proved to be the only one capable of killing the blaze without any danger of a back-flash. Water fog and a dry chemical extinguisher put out the blaze but back-flash occurred within seconds. Carbon tetrachloride failed to extinguish the fire. The extinguisher is non-toxic and shoots a stream 45 to 60 feet. Karbaloy, the chemical which is the key to the extinguisher's success, was developed by two engineers.

The PMTA's test results support the findings of E. C. Iverson, Nebraska State Fire Marshall, several years ago. In his tests, truck tires and tubes were mounted on rims and placed under a platform constructed of two-inch wooden members to simulate the underside of a truck trailer. The underside of this platform was treated with two coats of fire retardant chemical and one application of a protective undercoating.

The tires were placed under this mock truck body to reflect actual wheel and tire mountings as to spacing and clearing. Two tires, dual mounted, were used. They were ignited and allowed to pre-burn until well involved.

In the first test, a 25-pound dry chemical extinguisher put out the blaze in three minutes. A canvas, treated with fire retardant chemical, was placed over the tires immediately following application of the extinguisher. Yet re-ignition occurred and the heat charred several places in the canvas.

A later model, 20-pound dry chemical extinguisher knocked down the fire in about two minutes. Again a canvas was used and left over the tires for four minutes. Re-ignition occurred after the canvas was removed.

In the third test, a 2½-gallon Karabaloy extinguisher killed the blaze in 2½ minutes. Re-ignition did not occur. An optical pyrometer recorded a temperature of 2100°F.

In the fourth test, an asbestos blanket was placed over both tires at about 2350°F. The blanket was tucked around the tires for 15 minutes. Then a 2½-gallon pump tank was applied to the tires by directing the hose stream under the blanket. But when the asbestos blanket was removed, the base of the tires re-ignited.

Tire fires, according to O. C. Shipley, Director of Safety of the Pennsylvania Motor Truck Association, are one of the major reasons why the trucking industry is losing millions of dollars annually in valuable cargo and equipment. Losses on the Pennsylvania Turnpike alone, he points out, "have ranged from the loss of an empty trailer valued at $3,250 to a trailer loaded with penicillin reportedly valued at $250,000."

Coming Next Month.....

"Identification of Carbon Blacks by Means of Spectrophotometric Measurements"—by A. Fiorenza, Rubber Laboratories, Pirelli S. p. A., Milan, Italy.
The results of this investigation indicate that a definite relation exists between the diameter of the granules of carbon blacks and the color index of diluted dispersions and, further, that the determination of the latter offers a solution to some of the problems encountered with blacks.

"Dilute Solution Viscosity: Its Use and Interpretation with GR-S Polymers"—by June Duke and Dorothy Prem, Government Laboratories, University of Akron, Akron, Ohio.
A detailed description of the procedure used at the Government Laboratories for rapid measurements of viscosities of large numbers of samples. Includes a brief discussion of viscometry and its use for molecular weight determinations.

"Matching of Colors in Elastomers"—by A. J. Northam, Elastomers Division, E. I. du Pont de Nemours & Co., Wilmington, Delaware.
A comprehensive discussion of the art of coloring rubber to enhance eye appeal and trade acceptance. The author covers the numerous factors to be considered by the compounder and offers various suggestions for color selection.

"How the Army's Tire Technicians Save Rubber and Money."
The Tire Rebuild Depot maintained by the U. S. Army in Germany saves $5,000,000 annually through the reclamation of tires and tubes and the manufacture of needed rubber products. The hows and the whys are outlined.

Plus several short practical articles.

A Study on Vistex Gel Points in Various Types of Polymers

By T. B. LARCHAR*, W. K. TAFT*, J. DUKE*, H. R. MOONEY** and J. M. GYENGE†

Government Laboratories, University of Akron, Akron, Ohio

The vistex technique has been used to determine gel point conversions; in addition, intrinsic vistex or intrinsic viscosities at the gel point for various types of polymers were determined. The polymerization systems investigated at 122°, 41° and 0°F. included variations of the monomer ratio, emulsifiers and modifiers in the Mutual, sulfoxylate, sugar-free, low-sugar iron pyrophosphate and amine type formulas.

It was found that type of emulsifier in an otherwise comparable formula had a definite relationship to the gel point.

At comparable gel points, higher intrinsic viscosities were obtained as the temperature of polymerization was lowered, and at each temperature the copolymers had higher intrinsic viscosities than the homopolymers and higher intrinsic viscosity values were attained as the polymers increased in styrene content.

The gel point increased with increasing level of modification at all temperatures and the intrinsic viscosity at the gel point decreased more rapidly in the case of the copolymer than with the homopolymers with an increase in modifier.

IN making GR-S polymers and latices in general, the approach to the gel point can be an important factor. In certain cases, it is desired to make polymers of high molecular weight that are gel-free, such as polymers for oil masterbatches; in others, gel of various levels with viscosities of the sol portion varied may be desired. As far as the authors are aware, no detailed study has been made of the effect of various styrene ratios, formula and temperatures of polymerization on these molecular properties.

Harris and Kolthoff *(1)* pointed out the use of the solvent consisting of an 80/20 mixture by volume of benzene-isopropanol, rather than the xylene-pyridine mixtures previously used by Baker *(2)*, as the former solvent for latex had certain advantages, namely, complete solution at once and the determination can be carried out immediately at room temperature.

Henderson and Legge *(3)* have shown that the relationship between intrinsic vistex viscosities made in the benzene-isopropanol solution and the intrinsic viscosities of the corresponding dried polymers dissolved in toluene is:

$$\log (v)_T = 0.101 + 1.04 \log (v)_V,$$

where $(v)_T$ is the intrinsic viscosity in toluene, and $(v)_V$ is the intrinsic vistex viscosity.

Wood *(4)* reported data which show that the relationship of intrinsic viscosity and molecular weight is the same when determined in toluene or in benzene.

Morton and Salatiello *(5)* have shown that reproducible gel point determinations can be made with the intrinsic vistex technique using an 80/20 benzene-isopropanol solvent and diluting with pure benzene.

Test Procedure

Charges of 100/0, 85/15, and 71/29 butadiene-styrene were prepared according to the persulfate-DDM formula shown in Table I and polymerized at 122°F. in 8-ounce bottles. In addition, charges of 100/0 and 71/29 butadiene-styrene were prepared according to the formulas shown in Tables I and IA and polymerized at 41° and 0°F. in 8- and 28-ounce bottles.

At various stages of conversion, latex samples were withdrawn by syringe from the reaction bottles, and the vistex technique was used to obtain data to derive intrinsic vistex viscosity versus conversion curves for gel point determinations. A solvent mixture consisting of 80/20 parts by volume of benzene (thiophene-free)-isopropanol was used, and all solutions were made by dissolving one ml. of latex in 100 ml. of the solvent mixture (containing 0.01 gram of PBNA).

The solution was then filtered to remove extraneous matter, and the concentration was determined by evaporating a 25 ml. portion of the solution to dryness on a

TABLE I—POLYMERIZATION FORMULAS[a]

Ingredient	Persulfate-DDM 122°F.	Sugar-Free Iron-Pyro 41°F.	TETA-PCHP 0°F.
	parts		
Butadiene	100, 85 or 71	100 or 71	100 or 71
Styrene	0, 15 or 29	0 or 29	0 or 29
DDM	Varied	—	—
Sulfole B-8	—	Varied	Varied
Sodium fatty acid soap[b]	4.3 or	—	—
Dresinate 214[b]	4.3	4.5	—
Emersol 233	—	—	4.2
KOH	—	c	0.8[d]
Tamol N	—	0.1	—
KCl	—	0.5	—
$K_2HPO_4 \cdot 3H_2O$	—	—	0.75
TETA	—	—	0.40
$K_2S_2O_8$	0.23	—	—
PMHP[e]	—	0.1	—
PCHP[e]	—	—	0.25
$Fe(NO_3) \cdot 9H_2O$	—	—	0.01
$FeSO_4 \cdot 7H_2O$	—	0.152	—
$K_4P_2O_7$	—	0.168	—
Methanol	—	—	50
Water	180	180	170

(a) A factor of 1.5 grams per part was used for 28-ounce bottle charges. (b) Charged on the basis of solids in the soap. (c) Amount required to adjust the pH of the soap solution to 10.5 ± 0.2. (d) Amount required to adjust the pH of the soap solution to 10.2 ± 0.2. (e) Charged on a purity basis.

* Present address: Aviation Division, Olin Mathieson Chemical Corp., P. O. Box 480, Niagara Falls, N. Y.
** Present address: Firestone Tire & Rubber Co., Akron, Ohio.
† Present address: General Tire & Rubber Co., Akron, Ohio.

TABLE IA—41°F. POLYMERIZATION FORMULAS[a]

Ingredient	Sugar-Free	Sulfoxylate	Low-Sugar	DETA-PMHP	TEPA-DIBP
	parts				
Butadiene	100 or 71	100 or 71	100	100	100
Styrene	None or 29	None or 29	—	—	—
DDM, or	None to 0.20	None to 0.20	None to 0.20	None or 0.10	None or 0.10
Sulfole B-8	0.12 to 0.22	0.12 to 0.22	—	—	—
Dresinate 214[b] or	4.5	4.5	4.5	—	—
Potassium fatty acid (KFA)[b]	4.5	4.5	4.5	4.5	4.5
Potassium hydroxide	c	c	c	c	d
Potassium chloride	0.6	0.5	0.6	0.6	—
Trisodium phosphate dodecahydrate	—	—	—	—	0.30
Dipotassium phosphate	—	—	—	—	0.40
Versene Fe-3	—	0.03	—	—	0.01
Triton R-100	0.10	—	0.10	—	—
Daxad 11	—	None or 0.10	—	0.10	—
Sodium formaldehyde sulfoxylate	—	0.10	—	—	—
Para-menthane hydroperoxide (PMHP),[e] or	0.11	0.10	0.10	0.20	—
Diisopropyl benzene monohydroperoxide (DIBP)[e]	—	—	—	—	0.20
Diethylene triamine (DETA)	—	—	—	0.15	—
Tetraethylene pentamine (TEPA)	—	—	—	—	0.15
Dextrose[e]	—	—	1.25	—	—
Ferrous sulfate heptahydrate	0.17	0.02	0.15	0.005	—
Tetrapotassium pyrophosphate	0.188	—	0.21	—	—
Water (distilled)	180	180	180	180	180

(a) Charge factors of 0.5 and 1.5 grams per part were employed for 8- and 28-ounce bottles, respectively. (b) Charged on the basis of solids in the soap. (c) Amount required to adjust the pH of the soap solution to 10.3 ± 0.2. (d) Amount required to adjust the pH of the soap solution to 10.8 ± 0.2. (e) Charged on a 100% purity basis.

steam plate. The concentration value was corrected for non-polymer content as determined by conversion and charge parts and expressed in grams of polymer per 100 ml. of solution. The flow times were measured with Ostwald type viscometers, and the correction for kinetic energy effects was found to be negligible.

TABLE II—SUMMARIZED VISTEX DATA AT 122°F.

Emulsifier	BD/S (parts)	DDM (part)	Gel Point (% Conv.)	Intrinsic Vistex Viscosity[a]	Viscosity (ML-4)[b]
NaFA	71/29	0.12	26	4.45	156
	71/29	0.20	46	3.84	114
	71/29	0.25	65	3.28	96
	71/29	0.30	70	3.17	84
	71/29	0.40	78	2.92	57
	71/29	0.45	82	2.62	43
	85/15	0.20	39	3.87	137[c]
	85/15	0.30	56	3.44	97
	85/15	0.40	71	2.96	66
	85/15	0.50	81	2.49	44
	100/0	0.20	31	3.60	152[c]
	100/0	0.30	51	3.26	109
	100/0	0.40	62	3.17	78
	100/0	0.55	77	2.58	43
Dresinate 731	71/29	0.20	48	3.97	150
	71/29	0.30	62	3.50	110
	71/29	0.40	69	3.05	79
	71/29	0.50	75	2.73	64
	71/29	0.60	78	2.59	50
	85/15	0.20	41	3.96	172
	85/15	0.30	49	3.64	137
	85/15	0.40	60	3.32	113
	85/15	0.50	69	2.85	90
	85/15	0.63	73	2.55	69
	100/0	0.20	36	3.31	—
	100/0	0.30	42	3.26	156[c]
	100/0	0.40	48	3.19	125
	100/0	0.60	65	2.98	92
	100/0	0.75	73	2.57	69

(a) Value at the gel point. (b) Obtained on polymers prepared at 72 ± 2% conversion. (c) The polymer sample crumbled slightly.

The procedure used for the determination of the intrinsic vistex viscosity was to dilute the original latex solution in benzene-isopropanol with benzene to obtain solutions of ½ and ¼ of the original concentration. The relative viscosity was then determined for the solutions at each dilution by using the correct solvent flow time at that dilution of the solvents. This involved a correction for the effect of water present in the original latex sample. The intrinsic vistex viscosity was then determined by plotting

$$\frac{\ln t_r}{C}$$

(where t_r = effluent time of solution divided by the effluent time of the solvents) against the concentration and extrapolating to zero concentration. The intrinsic vistex viscosity or intrinsic viscosity versus conversion curve was drawn and the maximum point on the curve was taken as the gel point.

When the vistex intrinsic viscosity $(\eta)_V$ method for determining gel point was to be compared with the intrinsic viscosity method (η), two samples of latex were removed from the reaction bottle at the same time, one of which was injected into an isopropanol-benzene mixture as required by the vistex technique and the other was injected into a butanol-PBNA-HQ solution, which precipitated the polymer. The polymer was then dried in vacuum at room temperature and the intrinsic viscosity determined. A detailed comparison of intrinsic vistex viscosity versus intrinsic viscosity is reported elsewhere *(6)*.

Results and Discussion

The effect of monomer ratio, polymerization temperature and polymerization formula on gel formation was determined in this study, and because of the close interrelation of these variables, the following discussion will first be divided into variables of temperature.

Polymerization at 122°F.: The summarized vistex data for polymerizations of 100/0, 85/15 and 71/29 butadiene-styrene at 122°F. are shown in Table II.

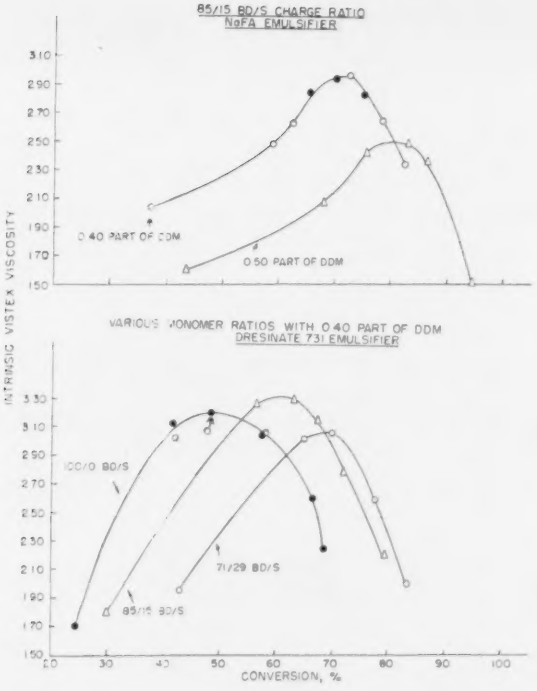

FIG. 1—Percent conversion versus intrinsic vistex viscosity.

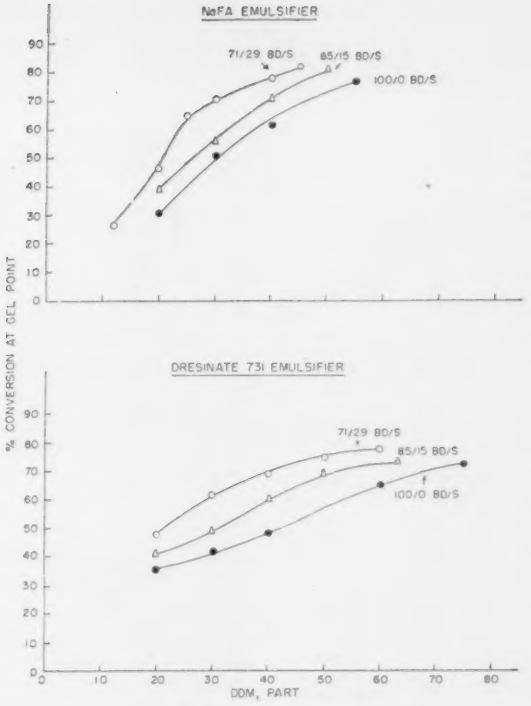

FIG. 2—Gel point versus modifier charge.

In order to determine the gel point of various polymers, as shown in Table II, charges with each monomer ratio were polymerized in the presence of various amounts of mercaptan (DDM). Polymers were prepared using sodium fatty acid soap (NaFA) or Dresinate 731 as emulsifiers.

The intrinsic vistex viscosity values obtained at the various levels of conversion were plotted to determine the gel point, and typical examples are shown in Figure 1. The reproducibility that is possible with the vistex technique at this temperature of polymerization can be seen from the curve representing an 85/15 butadiene-styrene charge that was modified with 0.40 part of DDM; the points with the different symbols on this curve are the result of two separate runs. A comparison of the intrinsic vistex viscosity curves (Figure 1) based on the data obtained with the use of charges containing the monomers in various ratios, but with a constant mercaptan concentration of 0.40 part, shows the upward rise in the gel point (maxima of intrinsic vistex viscosity occurring at higher conversions) with increased amounts of styrene.

The effect on the percent conversion at the gel point of variable amounts of modifier is shown in Figure 2. The gel point curves representative of polymerizations in which Dresinate 731 was used as the emulsifier, showed gel points at lower conversions at equal modifier loadings than polymerizations in which NaFA emulsifier was used. The high intrinsic vistex viscosity values at the gel point (Figure 3) indicate that higher molecular weight soluble material resulted when the gel point occurred at lower conversions. However, it will be noted that the molecular weight changed the least for polybutadiene up to a gel point of 65%. At equal gel point levels, higher intrinsic vistex viscosity values were attained with increased styrene content.

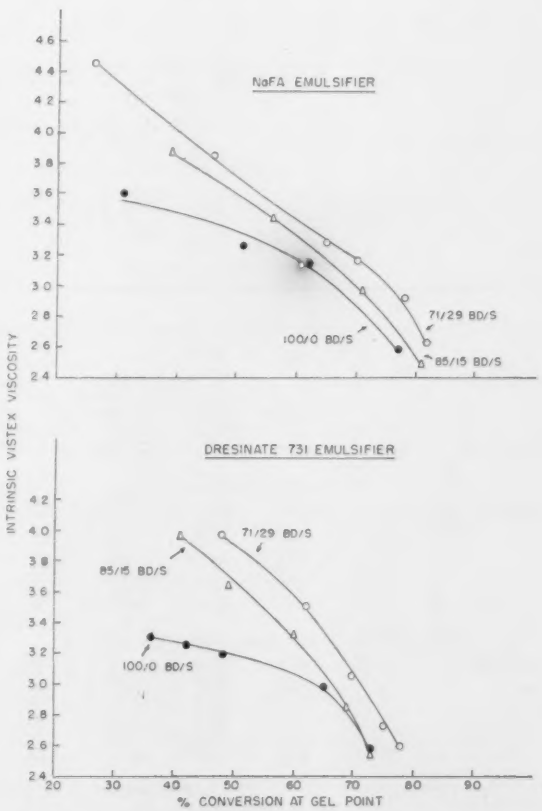

FIG. 3—Gel point versus intrinsic vistex viscosity.

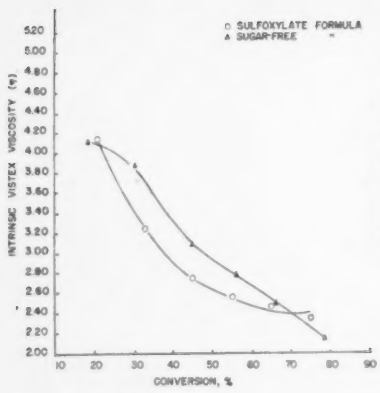

FIG. 4—Dresinate 214 and no modifier.

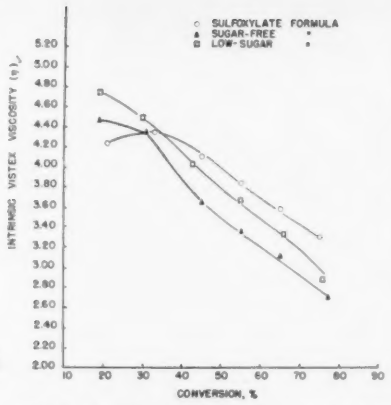

FIG. 5—Dresinate 214 and 0.10 part of DDM.

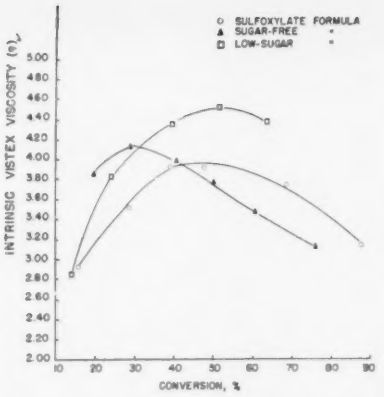

FIG. 6—Dresinate 214 and 0.20 part of DDM.

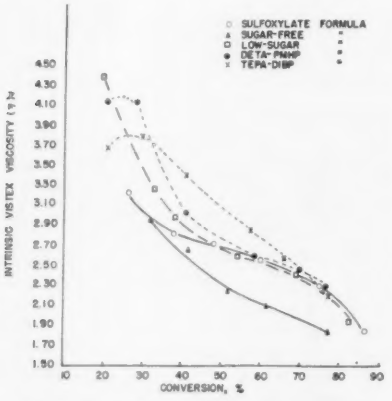

FIG. 7—KFA soap and no modifier.

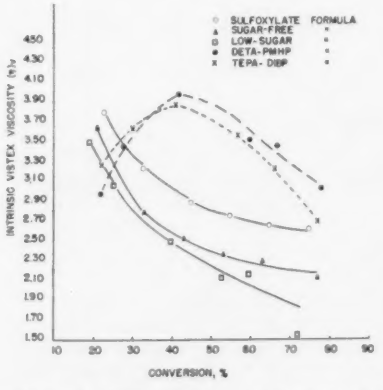

FIG. 8—KFA soap and 0.10 part of DDM.

FIGS. 4-8—Percent conversion versus intrinsic vistex viscosity for polybutadiene at 41°F.

TABLE III—SUMMARIZED VISTEX DATA FOR POLYMER PREPARED AT 41°F.

Emulsifier	BD/S (parts)	Sulfole B-8 (part)	Gel Point (% Conv.)	Intrinsic Vistex Viscosity[a] $(\eta)_v$	Viscosity (ML-4)[b]
		Sulfoxylate Formula			
Dresinate 214	71/29	0.12	81.1	3.90	112
	71/29	0.12	84.3	3.89	124
	71/29	0.16	77.2	3.14	92
	71/29	0.16	85.5	3.62	81
	71/29	0.22	73.6	2.45	54
	71/29	0.22	87.6	2.97	47
		Sugar-Free Iron-Pyrophosphate Formula			
Dresinate 214	71/29	0.12	60.4	4.22	156
	71/29	0.12	65.0	4.20	158
	71/29	0.16	75.4	3.16	84
	71/29	0.16	85.8	3.63	99
	71/29	0.22	75.3	2.36	54
	71/29	0.22	83.8	3.13	60

(a) Value at gel point. (b) Determined on polymer prepared at 60 ± 3% conversion.

Polymerization at 41°F.: To compare intrinsic vistex viscosities $(\eta)_v$ at various conversions and gel points, charges of 71/29 butadiene-styrene were polymerized at 41°F. in 8-ounce bottles according to the sulfoxylate and the sugar-free iron-pyrophosphate formulas. The charges were prepared with Dresinate 214 as the emulsifier (the potassium soap of rosin acid whereas Dresinate 731 is the sodium soap) and with 0.12, 0.16 and 0.22 part levels of Sulfole B-8 for modification. The conversion at the gel point versus intrinsic vistex viscosity data of duplicate runs are shown in Table III.

Charges polymerized by the sulfoxylate formula with the use of 0.12 part of Sulfole B-8 yielded polymers at 60% conversion of lower Mooney viscosity than those prepared with the sugar-free formula. Intrinsic vistex viscosity results were lower and gel points higher for polymer samples made at various levels of conversion when prepared by the sulfoxylate formula. At 60% conversion and at higher levels of modification (0.16 and 0.22 part of Sulfole B-8), Mooney viscosities of polymers prepared by the two formulas were nearly the same.

Within the limits of reproducibility, the intrinsic vistex viscosity-conversion relationships and gel points

TABLE IV—AVERAGED VISTEX DATA FOR POLYBUTADIENE PREPARED AT 41°F.

Emulsifier	Sulfole B-8 (part)	Gel Point (% Conv.)	Intrinsic Vistex Viscosity[a] $(\eta)_v$
	Sulfoxylate Formula		
Dresinate 214	None	<21	4.16[b]
Dresinate 214	0.10	32	4.35
Dresinate 214	0.20	45	3.96
KFA	None	<27	3.24[b]
KFA	0.10	<23	3.79[b]
	Sugar-Free Iron-Pyrophosphate Formula		
Dresinate 214	None	<19	4.11[b]
Dresinate 214	0.10	<19	4.47[b]
Dresinate 214	0.20	29	4.14
KFA	None	<32	2.97[b]
KFA	0.10	<21	3.63[b]
	Low-Sugar Formula		
Dresinate 214	0.10	<19	4.75[b]
Dresinate 214	0.20	52	4.52
KFA	None	<20	4.40[b]
KFA	0.10	<19	3.49[b]
	DETA-PMHP Formula		
KFA	None	24	4.20
KFA	0.10	42	3.96
	TEPA-DIBP Formula		
KFA	None	26	3.82
KFA	0.10	41	3.85

(a) Value at gel point. (b) Intrinsic vistex viscosity of first sample taken and gel point exceeded.

TABLE V—GEL POINTS AND INTRINSIC VISCOSITIES AT THE GEL POINT WITH VARIED MODIFICATION

Charge No.	Modifier (part)	Vistex Method: Gel Point, % Conv.	Vistex Method: $(\eta)_v$ G. P.	Solid Polymer Method: Gel Point, % Conv.	Solid Polymer Method: (η) G. P.
	71/29 BD/S, 122°F., NaFA, DDM				
M1	0.10	35[a]	4.42	27	4.12
M2	0.20	57	3.72	57	3.58
M3	0.30	72	3.02	72	3.00
M4	0.40	82	2.74	79	2.70
M5	0.50	86	2.35	86	2.52
	100/0 BD/S, 122°F., NaFA, DDM				
M6	0.10	<25	>3.74	22	3.58
M7	0.20	42	3.50	43	3.32
M8	0.30	55	3.28	56	3.25
M9	0.40	66	2.90	67	2.88
M10	0.50	76	2.66	76	2.63
	71/29 BD/S, 41°F., Dresinate 214, Sulfole B-8				
M15	0.02	25	5.12	28	5.10
M11	0.05	41	5.10	47	5.04
M12	0.10	73	4.44	—	—
M14	0.15	83	4.00	82	3.94
M24	0.25	82	4.10	—	—
	100/0 BD/S, 41°F., Dresinate 214, Sulfole B-8				
M19	0.05	30	4.15	29	4.20
M18	0.10	46	4.45	54	4.38
M16	0.20	56	4.10	62	3.90
M17	0.30	81	3.94	81	3.86
	71/29 BD/S, 0°F., K Oleate, Sulfole B-8				
M22	None	70	5.38	71	5.57
	100/0 BD/S, 0°F., K Oleate, Sulfole B-8				
M21	None	55	5.15	42	4.75
M23	0.05	73	5.16	74	5.04

(a) This value may be high; data are insufficient for a good curve.

for polymers prepared by the two formulas at the two higher modifier levels were generally similar. It will be noted that reproducibility between charges is not as good as for the 122°F. polymerization. This may be caused by the varying rates at 41°F., thus affecting modification, compared to the uniform rates obtained at 122°F.

Charges of butadiene were polymerized at 41°F. in 28-ounce bottles according to various formulas to determine intrinsic vistex viscosity versus conversion relationships of low and unmodified polybutadiene polymers. Charges were prepared with either Dresinate 214 or potassium fatty acid soap (KFA) as emulsifier and variable amounts of DDM were added for modification. The averaged data (determined graphically) are shown in Table IV and Figures 4 to 8.

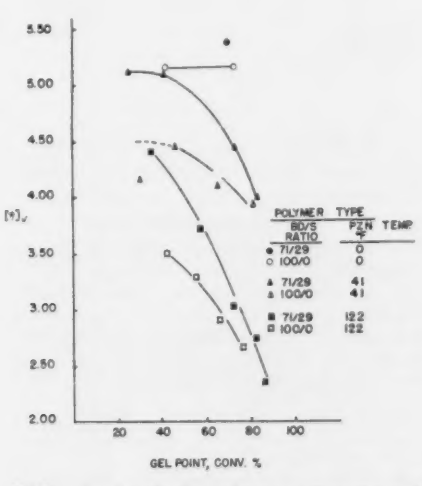

FIG. 9—Intrinsic vistex viscosity-gel point relationship.

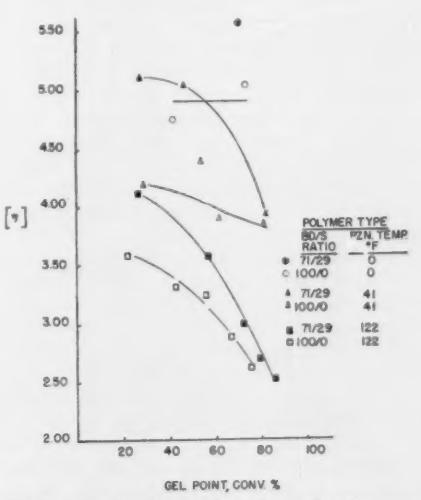

FIG. 10—Intrinsic viscosity-gel point relationship.

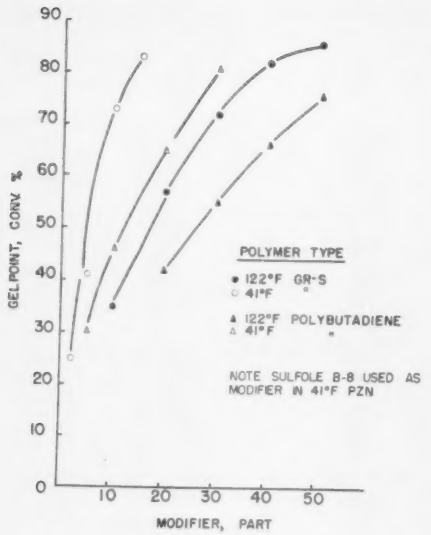

FIG. 11—Effect of modifier level on the gel point.

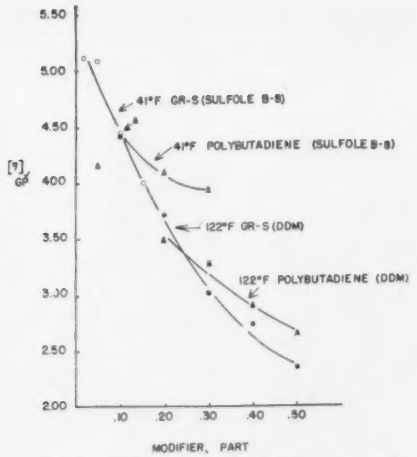

FIG. 12—Effect of modifier level on the intrinsic vistex viscosity at the gel point.

With Dresinate 214 and in the absence of modifier, charges polymerized by the sugar-free iron-pyrophosphate formula yielded polybutadiene with higher intrinsic vistex viscosities at comparable conversions beyond the gel point than were obtained with the sulfoxylate formula (Figure 4). The actual gel point has not been determined because the conversion in both cases at the gel point is below 20%, so that the effect of the type of formula (unmodified) on gel point is not apparent from the data, unless interpretation is made from the shape of the curves.

Charges polymerized under the same conditions by the low-sugar iron-pyrophosphate formula yielded erratic polymerization results and therefore could not be evaluated; one charge polymerized to 78% conversion, but two additional charges died at 28 and 32% conversion, respectively. When 0.10 part of DDM was added for modification (Figure 5), the gel points for polymers prepared by the low-sugar iron-pyrophosphate and the sugar-free iron-pyrophosphate formulas are both probably below 20% conversion, but for the sulfoxylate formula occurred at a definitely higher conversion (about 32%). With the use of 0.20 part of DDM for modification (Figure 6), the gel points rose to 29, 45 and 52% conversion for the sugar-free, sulfoxylate and the low-sugar formulas, respectively. At both levels of DDM, the intrinsic vistex viscosities at the gel point were highest for polymers prepared by the low-sugar formula.

The effect of formula on conversion at the gel point is shown for polybutadiene with a zero and 0.1 part DDM level prepared at 41°F. with KFA emulsification. (Table IV and Figures 7 and 8). The gel points for the sulfoxylate, sugar-free and low-sugar formulas are below the first sample taken. With the low-sugar formula and at 0.1 part DDM level, the conversion at the gel point is lower than when Dresinate 214 was used (ca. 32%). The amine formulas without modifier both showed gel points and with higher gel points for 0.1 part DDM.

To compare the effect, at various temperatures of polymerization, of various levels of modification upon the gel point and the intrinsic viscosity of the polymers at the gel point, charges of 100/0 and 71/29 butadiene-styrene ratios were made according to suitable formulas (Table I) and polymerized at 0°, 41° or 122°F. The intrinsic vistex viscosity $(\eta)_V$ and the intrinsic viscosity (η) values were determined for samples taken simultaneously from the charge at various degrees of conversion during polymerization (Table V). Gel point values derived from the intrinsic vistex viscosity-conversion curves as well as the intrinsic viscosities of the soluble portions compared favorably in most cases (Table V).

At comparable gel points (achieved by adjusting the modifier level), higher intrinsic viscosities occurred as the temperature of polymerization was lowered and at each temperature the butadiene-styrene copolymers possessed higher intrinsic viscosities than the polybutadiene polymers (Table V, Figures 9 and 10).

At both temperatures of polymerization (122° and 41°F.) the gel point increased with the level of modification as was expected (Figure 11). It was noted at both 41° and 122°F. that the intrinsic viscosity at the gel point, as the gel point was raised by higher levels of modification, decreased more rapidly with the butadiene-styrene copolymer than with the polybutadiene polymer (Figure 12).

Branching and cross-linking of the polymers were so suppressed at the polymerization temperature of 0°F., that the gel point of an unmodified charge of polybutadiene occurred at 55% conversion and of an unmodified butadiene-styrene charge at 70% conversion (Table V).

SPECIAL NOTE

The work discussed herein was performed as a part of the research project sponsored by the National Science Foundation.

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(3) Henderson, D. A., and Legge, N. R., *Canadian Journal of Research*, Vol. 27, 1949.
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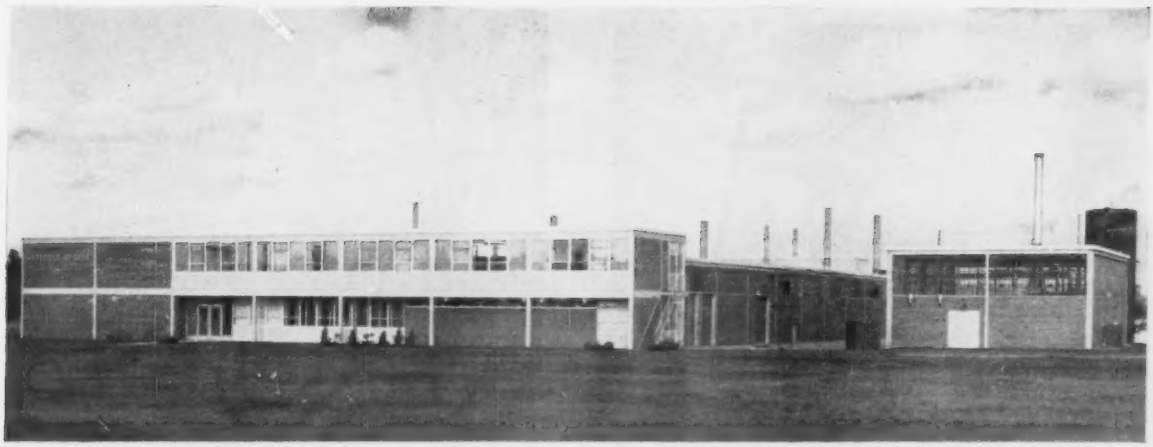

Exterior view of the new tire manufacturing plant of Mansfield Rubber (Canada) Ltd. in Barrie, Ontario, Canada.

Latest Tire Manufacturing Equipment Features Canada's New Plant

By GEORGE E. TOLES

THE first new tire manufacturing plant to be established in Canada in 27 years recently began operations at Barrie, Ontario. Mansfield Rubber (Canada) Ltd. is turning out tires in a 75,000 square foot plant on a 30 acre site. The general plant layout is shown in Figure 1. The tires are made under special brand labels and customers are large national distributors.

The Canadian Mansfield Company is not a branch operation but is affiliated with other leading U. S. tire manufacturers who provided capital and whose patents and processes are available to the Canadian concern. The company's organization and policy are designed to meet conditions in the tire business which are peculiar to Canada.

L. T. Rosser, president, reports that the new plant has progressed at a relatively rapid pace and is now near capacity output. The new unit is a fully integrated plant following all tire processing, with the exception of cord dipping, from the raw material to the finished product stage. It features one-floor operation for efficiency as opposed to older plants in Canada which are multiple-floor setups. The newest type of automatic machinery has been installed.

Mills of the standard 60-inch (Figure 2) and 80-inch size are used. The bias cutter (Figure 3) is one of the latest designed by the National Rubber Machinery Co. of Akron, Ohio, with complete electronic controls. The tire building machines are also products of National Rubber Machinery.

The tread handling method with a special cooling unit (Figure 4), designed by the Engineering Department of the Mansfield Tire and Rubber Co. of Mansfield, Ohio, has proven to be highly efficient in that it delivers

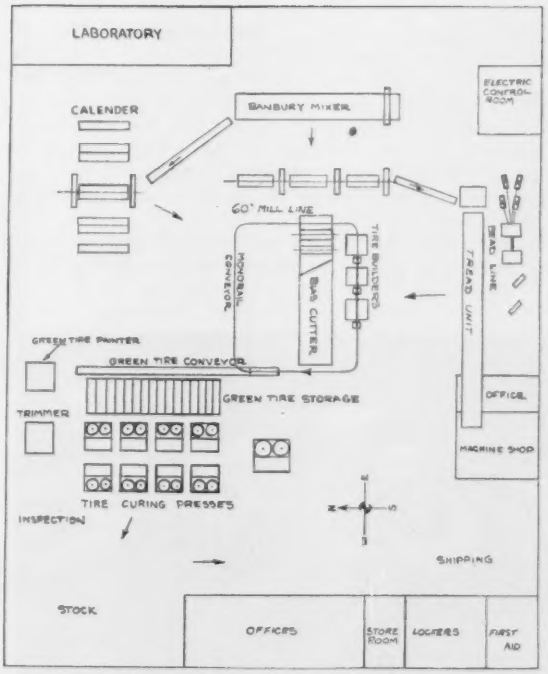

FIG. 1—General layout of the Mansfield Rubber (Canada) Ltd. plant. It is the first new tire manufacturing plant to be established in Canada in the past twenty-seven years.

FIG. 2—View of 60-inch mills used for mixing stock. Note conveyor operation which eliminates trucking materials about the plant

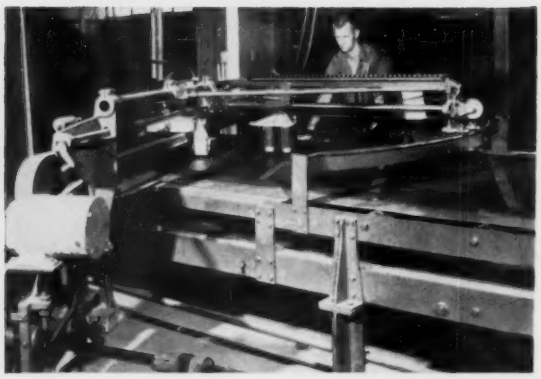

FIG. 3—Bias cutter for cutting cord fabric for tires. Controlled by electronic instruments, the cutter measures and cuts to exact dimensions all tire fabric.

cool treads which have shown little tendency towards contraction or expansion prior to use by the builders. Control of calendered fabric with a beta-ray gauge, the product of Isotope Products Ltd., Oakville, Ontario, has helped maintain a high degree of consistency.

All curing presses in the plant (Figure 5) are from the McNeil Machine and Engineering Co. of Akron and are of the automatic type. The company is using both platen and steam dome presses. Press sizes are 40, 45, 47½, and 55 inches.

Machines are close coupled and conveyors eliminate the necessity of trucking materials about the plant. The factory is well lighted and ventilated. Bright, dynamic colors are used on all machines and equipment. Color serves several purposes—to identify pipes, controls, danger areas, etc., and to create high visability of working areas.

Under management policy, team operation is encouraged and groups work together on sections of production as opposed to individuals working independently for their own separate gain. Coordination of activity and a good spirit of cooperation is evident in the new plant.

Efficiency is the keynote of the entire enterprise. There is a high ratio of machines to manpower. Thus, a few well trained workers can turn out a large volume of production.

As specialists in making tires for large markets under their own name and by keeping the manufacturing function separate from selling and merchandising, it is possible to develop a low over-all operating cost at Mansfield.

Management points out that the growing car registration of Canada and its potential future growth made a new plant feasible. A segment of the tire trade required special brand merchandise because their type of marketing covered too wide an area to justify a brand they could not control.

Economies of manufacturing and marketing could be best attained through using the latest methods, some of which were difficult without gearing building design, machines and men together. The new plant will remain flexible so that it can be adapted quickly to change and growth conditions.

Conditions at the new plant already justify an initial expansion, it was pointed out. Additional equipment has been placed on order to increase plant capacity fifty percent.

Barrie was selected as site for the factory because of its liberal water supply, good pool of labor, and land area for future development. Good rail and highway transportation facilities were available and adequate power was at hand. The selection of a smaller community also was made to avoid traffic congestion. Thirty-three communities were studied before Barrie was chosen and management described the selection as "most gratifying."

FIG. 4—Building operation where treads, beads and fabric are assembled to a form simulating a wide band prior to being prepared for curing.

FIG. 5—View of press line. The company is using both platen and steam dome presses. Press sizes are 40, 45, 47½, and 55 inches.

The Silicone Alloys: New Structural Compounds

By CHARLES L. PETZE, Jr.

Chairman, Delaware Research & Development Corp., Wilmington 3, Delaware

SULFUR-hardened rubber was perhaps the first structurally useful rubber, that is, one having a modulus of elasticity in flexure of, say, 100,000 psi or more. According to Whitby *(1)*, hard rubber in 1951 accounted for only one percent of all types of natural and synthetic rubbers consumed. But this small percentage figure can be misleading; the hard rubbers on occasion have had far-reaching importance.

For example, in 1855, when he was 68 years old and had exploited successfully for more than a decade his basic vulcanizing patent, Thomas Hancock had to defend his invention against a particularly sharp attack. Like many inventors, Hancock worked alone and kept few records. As he wrote in his *Personal Narrative (2)*, he had to prod his "failing memory", to ransack his "drawers, boxes and receptacles" for scraps of vulcanized rubber. He found plenty "of very early ones that were vulcanized; but mostly without dates. There was fortunately, however, one dated the 4th of June (1843), and several in August, one of which was hard vulcanized". A fragment of a hard rubber became important evidence of Hancock's work on vulcanization.

Hancock's patents *(3)* and his book tell us that he hardened rubber in several different ways to obtain useful products. For thin sections, he used Alexander Parkes' sulfur chloride technique, which he described as "an elegant and simple (process), no heat being required." For thick sheets, Hancock used elemental sulfur and many hours of time to complete vulcanization, a method still used today. In the interests of economy—Hancock must have been an intensely practical as well as an open-minded man, productivity per man hour and ingredient cost were realities to him—he also used "on account of its cheapness, the common resin of commerce" in place of substantial amounts of sulfur.

Hancock's Recipes

He stated that he found "to be useful for many purposes; sixteen parts caoutchouc, two parts sulphur, six parts resin; or sixteen caoutchouc, four sulphur, two resin". These recipes may be given more familiarly as 12.5 to 25 parts sulfur and 37.5 to 12.5 parts resin, respectively, per 100 parts rubber. It is somewhat surprising, therefore, to find the same British Patent Office more than 100 years later granting a patent *(4)* for a hard rubber comprising 16 to 28 parts of sulfur and not more than one hundred parts of a resin per one hundred parts of rubber.

Hancock appreciated the value of his several hard rubbers, stating that his "patent for moulding and giving permanency to forms by vulcanizing, has, in fact, tended to bring the hard 'changed' rubber prominently into view . . . (there being) no other limit to the extent of its employment, except that which arises in point of utility, appearance, or economy in competition with other materials".

Note: This paper was presented before the 69th Meeting of the Division of Rubber Chemistry, American Chemical Society, Cleveland, Ohio, May 16-18, 1956.

But there must have been some regret as well, for in the Preface to his *Personal Narrative*, Hancock wrote: "There are exceptions to every rule, and for some purposes rubber vulcanized to the hard, horny state may be advantageously employed; but the article should be used in this form only for special purposes. There are other materials of a non-elastic nature in abundance, the comparative cheapness of which is the best safeguard against the perversion of so valuable a substance as rubber from its legitimate use."

Hancock claimed for rubber that "it is its elastic property that is so valuable—a property which no other substance possesses in the same degree or kind." As we know today, the true cause of Hancock's unhappiness was not improper or unwise use of rubber, but, rather, the methods that he had to use to harden it. Even today, with high sulfur vulcanization, the unique property of rubber is not preserved to contribute the vital characteristic of toughness to the final product.

New Structural Compounds

We call our new tough, hard, structural compounds, on which composition of matter patents are pending, silicone alloys, to identify the source of their unique and valuable properties. The rubbery bases used may be compounded with a variety of other materials to provide a wide range of general properties. But, like so many useful rubber products containing 40%, 20%, 10% or even less rubber by weight, it is their rubber content that gives them their novel properties; it is essential to the properties required by the end uses. Without it we have nothing.

Our objective—which we are still pursuing in an effort to realize further improvements—was to provide new engineering materials characterized by toughness, flexural strength, electrical and dielectric characteristics, dimensional stability, weatherability, and the surface, machining, and other processing attributes required to make them useful especially in exposed electrical, electronic, and structural applications, some of which involve repeated immersion to substantial depths in sea water as well as long-continued exposure to wind and sun.

It was postulated at the beginning of our work more than six years ago that a composition embodying rubber, to obtain toughness, might provide the desired answer. It was obvious from the specific properties required that sulfur-hardened rubber, despite its low water absorption, dimensional stability, and high flexural strength, could not be considered. It would be much too brittle. Its dielectric properties would be inadequate. Productivity, per man hour and per machine hour, for finished products made of it would be far too low. It was equally obvious, for differing reasons in each case, that none of the known rigid, non-rubber compounds, nor rubber-resin blends, nor conventional rubber compounding practices could be used successfully. A new composition was required if our objectives were to be reached. It was found in the silicone alloys.

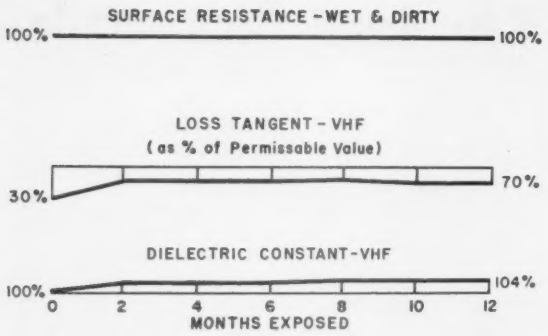

FIG. 1—Effects of outdoor weathering on a silicone alloy. (Representative electrical properties as percent of initial values).

One alloy having a total rubber content just under 30% by weight (other alloys contain greater amounts and some appreciably less) has been used to produce streamline fairing sections measuring about 15 inches by 8 inches and tapering from a leading edge having a projected width of nearly 1.25 inches to a feathered trailing edge. The finished piece, which weighs nearly 1.3 pounds, fits on a stainless steel mast and must remain free to rotate when exposed to all kinds of weather and temperature conditions, including immersion in sea water. Its function is to absorb sudden shock stresses in order to protect a submarine antenna mast against breakage.

Physical properties of this alloy include:

Specific gravity	1.06
Flexural strength, psi	7,190
Modulus in flexure, psi	255,000
Impact Strength, machined notched Izod, fppi	6.8
Heat distortion point, 264 psi, not annealed, °F.	190
Hardness, Shore D, 10 seconds	70

Other silicone alloys have flexural moduli above 450,000 psi. Some have heat distortion points in excess of 250°F. at 264 psi load and of 320°F. at 66 psi load, in the unannealed condition. Impact strength in excess of eight foot-pounds per inch and tensile elongation at break exceeding 60% are available in an alloy having a flexural modulus of 224,000 psi. All of them can be processed into end products at high productivity rates, for none requires vulcanization or curing.

In large measure because they contain no sulfur, metal oxides or other conventional curing agents or accelerators, alloys with dielectric constants approximating 2.50 and loss tangents of 0.0005 at microwave frequencies are available. Dielectric strengths, measured on 1/16-inch thick specimens, run from 600 to more than 800 volts per mil, with surface resistivities at 95% relative humidity in excess of 10^{14} ohms and volume resistivities at the same high humidity above 10^{15} ohm centimeters.

Some Engineering Applications

All of the alloys are distinguished by their hydrophobic surface characteristic, which is maintained fully even after deep machining, and by the stability of their mechanical and electrical properties with continued outdoor exposure and use, features for which design engineers have been pleading.

Insulators supporting the large whip antennas used on submarines must have a high order of surface insulation resistance within a few seconds after the antenna is raised above the surface of the sea. It is not sufficient that the insulating material have the required flexural strength and toughness, a high electrical resistance, a low loss factor, and be highly water repellent when clean. If the material, on exposure for months to the elements without cleaning, permits accumulation of a continuous, or nearly continuous, film of foreign matter on its surface or undergoes crazing or cracking to form tracks of low resistance, the overall efficiency of the communications system may be severely reduced, perhaps even to the point where the equipment is useless for its intended purpose.

A fluorocarbon insulator—when clean, an exceptionally good material—degrades, when in the wet and dirty state, within six months to an undesirably low value of surface insulation resistance. The silicone alloy, however, under the same conditions retains better its equally high initial surface insulation resistance after outdoor exposure for a full year, as is shown in Figure 1. It also does not degrade mechanically; in particular, it does not embrittle, as is shown in Figure 2. The alloy tested contained neither pigment nor antioxidant nor ultraviolet light absorber; its property stability and freedom from cracking and crazing result from its basic silicone composition.

Two Testing Periods Used

The graph of Figure 3 was constructed by computing and plotting the ratio of the value of surface resistivity for the same silicone alloy to the value for the fluorocarbon, as determined by the Submarine Antenna Branch of the Navy Underwater Sound Laboratory. The test specimens were sections of rod stock about two inches in diameter, which were mounted in a rack attached to the deck rail of an active fleet submarine and exposed continuously to the elements, initially for 26 weeks beginning in October, 1954. They then were removed from the rack, cleaned thoroughly with an aerosol, and sanded. The specimens were replaced in the rack and exposed for another eleven weeks. The surface resistivities of the dirt-encrusted specimens were measured at a high frequency after they had been "conditioned" further by soaking them in sea water immediately before testing. In 30 seconds after the resistance test began, the resistivity of the silicone alloy was ten times higher than the value for the fluorocarbon; in three minutes it was more than thirty times as effective.

Another test result obtained by the Underwater Sound Laboratory illustrates the strength of the alloy. The antenna support insulator is constructed with a one-inch diameter steel stud molded as a partial insert; the stud is grooved in a criss-cross pattern to lock the dielectric material in place. An insulator was mounted in a torque testing set-up having a capacity of 200 foot-pounds. This test equipment did not have sufficient capacity to turn the stud in the alloy; the molded assembly did not break. By way of comparison, the equipment broke a one-half inch diameter steel cap-screw at a torque of 85 foot-pounds. It should be mentioned that insulators, such as end seal bushings, made of this silicone alloy cost only about one-third as much as the corresponding part made of a tetrafluorocarbon.

Another interesting structural application is a large dome having wall thicknesses varying more than eightfold in a completed molding having a gross weight of about 60 pounds. This dome was designed by the Un-

derwater Sound Laboratory to house multi-band omnidirectional microwave antennas. Mounted outboard on a submarine, the dome has a two-fold responsibility: (1) to protect the electronic system against external forces and infiltration of sea water even when submerged to great depths and when subjected to severe shock stresses, and (2) to provide for proper transmission at different microwave frequencies for the full 360° of azimuth.

Stability a Necessity

The dielectric material must remain dimensionally stable, when subjected to combined temperature and pressure cycling, if the seal at the clamping ring is to be maintained. There must be no plastic flow of material between points in the dome itself. There must be no displacement of any part of the dome wall toward the precision antenna. The molded material, of course, must be free of voids; a void would offer the hazard of reflection at the air-dielectric interface as the electromagnetic beam passed through the material. The molded compound also must be capable of being machined to close tolerances, without destroying its surface properties, in order that the several required wall thicknesses may be obtained economically.

Silicone alloy domes have been found to transmit faithfully the required beam patterns, to maintain their dielectric properties, to remain completely dimensionally stable when exposed to temperatures cycled from —40° to 150°F. and to pressures cycled between atmospheric and 500 psi hydrostatic.

A silicone alloy dome in use on a modern submarine since March, 1955, has provided complete protection to the antenna. There has been no leakage of sea water into the system. This alloy, which contains neither pigment nor antioxidant nor ultra-violet light absorber, shows no evidence of cracking or crazing. The surface is reported to have the same characteristics it had when new. Above all, the antenna is reported to have performed flawlessly and to have required no maintenance or repair. Another dome in use at a Connecticut Navy shore installation since the summer of 1955 has given equally satisfactory service.

The attributes of dimensional stability under continued stress and maintenance of surface insulation resistance for long periods of outdoor exposure without cleaning caused the Wind Turbine Company of West Chester, Pennsylvania, to produce silicone alloy strain insulators for broad-band curtain antennas used in the Arctic. Rod stock was machined to the appropriate contour and the holding eyes and end shields mechanically clamped in place. The antenna engineers reported that the silicone alloy insulator suffered much less ice build-up than the conventional ceramic insulator and, in addition, withstood far better the abuse occasioned when the ice was knocked off. The silicone alloy insulators did not break, chip or crack.

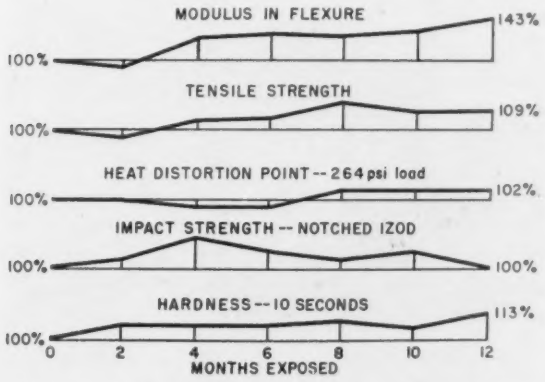

FIG. 2—Effects of outdoor weathering on a silicone alloy. (Representative physical properties as percent of initial values).

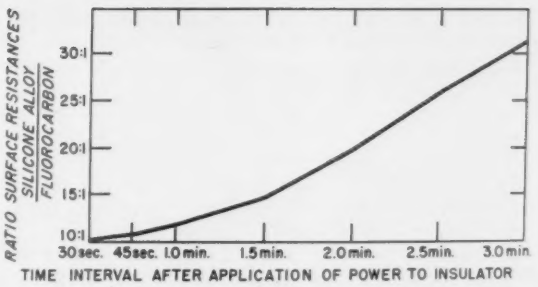

FIG. 3—Comparative recovery of silicone alloy versus fluorocarbon. (Ratio of surface resistances in megohms/square at 1 mc.).

A promising field for expanding use of polymer materials is in construction of microwave antenna lenses, for radar, for relay links and communications networks. The Microwave Antennas and Components Branch of the Naval Research Laboratory has taken a leading part in encouraging development of dielectric materials appropriate for lens construction. The Branch, about one year ago, designed, had built, and tested a ±20° bifocal lens employing a silicone alloy. This work was done in part to determine the acceptability of the alloy as a lens material, including its homogeneity and isotropy, its capability of being fabricated into large thick sheets economically, and its machineability to the close tolerances required. The effective diameter of this lens is 16 inches, the maximum thickness 2.28 inches, and the focal length 22.4 inches, with both faces machined to differing convex contours. The mounting rim, a part of the lens blank as molded, is 0.75-inch wide and 0.50-inch thick. The finished lens weighs approximately 11 pounds.

The alloy was found to machine very well. Void-free thick sheets were produced quickly and easily. Beam pattern determinations at 34,900 megacycles per second proved that the material was homogenous and isotropic throughout. No phase errors were introduced. It was concluded that the silicone alloy performs very well as a lens. This is not an obvious application for a rubber product.

Conclusion

In conclusion, it is refreshing to recall Elton Trueblood's comment *(5)* that "history is the story of the persistent introduction of novelty. Men invent new tools and thereby utilize unsuspected resources. To invent is to alter the course of events by the power of creative thought." Certainly Thomas Hancock was creative, was persistent in his efforts to capitalize on the unique, the elastic property of rubber. He sought constantly for better means of compounding and treating rubber to extend, as he phrased it, "its legitimate use".

Today, it not only is possible, it is in fact necessary, to use rubber of one kind or another in compounds for product applications unknown in Hancock's day, thanks in large measure to new producing, compounding and processing techniques. Better insulators for submarine whip antennas and for broad-band curtain antennas, lenses that, although optically opaque, direct as well as transmit electromagnetic beams, streamline fairing sections serving to protect stainless steel masts against breakage and other products are available because of advances in rubber technology. The toughness of rubber is preserved and put to its "legitimate use" in compositions characterized by high values of flexural modulus, of electrical and dielectric properties, by rapid processibility and easy machineability, and by stability upon continued exposure to severe service conditions. These compositions were not to be obtained with conventional rubber compounding practices; novel ideas were required to arrive at these new structural compounds—the silicone alloys.

ACKNOWLEDGMENT

The author wishes to acknowledge with thanks the contributions that other men have made to this development, in particular the work of his associate at the Delaware Research & Development Corporation, Thomas J. Dietz, the inventor of the silicone alloys.

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"On End" Stowage Finding Favor in Shipment of Crepe Rubber

A NEW method of ship stowage for crepe rubber, called "on end" stowage, is being hailed by insurers, steamship lines, and importers as one of the most important advances in the shipping industry in the last ten years.

The change, which eliminates expenditures of many thousands of dollars yearly and speeds final delivery of rubber shipments from the Far East, is the result of a two year campaign by the Insurance Company of North America Companies to convert rubber carrying steamship lines to "on end" stowage. Isthmian Steamship Lines, which pioneered the new method at the insurance company's suggestion, report that over the past ten months 20 vessels have arrived in the U.S. with clean outturn and absence of fusion.

Crepe rubber has always presented a shipment problem to steamship lines because of its naturally tacky state. Rubber is shipped from the Far East in unprotected bales bound by heavy steel straps. Unless the bales are separated during shipment, they tend to adhere to each other, clustering into huge masses in a ship's hold due to normal stowage pressure. In order to prevent fusion, it had been the practice of the stevedores when loading the vessel to use dunnage, such as boards or reed mats, between the layers of the bales of rubber. More recently coated paper or plastic sheets were used. Although the use of such dunnage material eliminated the fusion of the bales, a new problem was presented in that the dunnage material became imbedded in the bales and adhered to the rubber. This foreign material then had to be removed by expensive hand labor before importers would accept delivery.

Although a bale of rubber is "bareback" with four of its six sides uncovered, it does have two burlap patches on opposite sides which bear shipping identification marks. "On end" stowage utilizes the two burlap patches as built-in cargo separators by placing the bales on the sides which are protected by burlap. The burlap prevents fusion and contamination from the use of separators.

Marine insurers, importers, and steamship lines are all said to benefit from "on end" stowage. By preventing contamination, costly and time-consuming hand labor performed on the piers by gangs of public weighers is eliminated. At a rate of $4.60 per man hour, the charges range from $30 to $3,000 for the cleaning of a 500-bale shipment, depending upon the severity of contamination. "On end" also enables rubber importers to meet their contractual delivery dates by doing away with delays and pier congestion while cargoes await cleaning. Finally, it saves steamship lines the cost of purchasing separator material for each voyage.

(EDITOR'S NOTE: According to the New York shipping industry in general, the "on end" method is not going to be the answer to the problem. Although two lines have urged adoption of end-to-end stowage, others indicate that it has been tried unsuccessfully in the past. Several other systems have also met with disfavor for one reason or another. A special group is currently endeavoring to work out a satisfactory solution.)

As indicated in this view, "on end" stowage utilizes the two burlap patches on rubber bales as built-in separators. The burlap prevents fusion of the bales and eliminates contamination from other less effective separators.

New Press Cures Belts Up to 78 Inches Wide

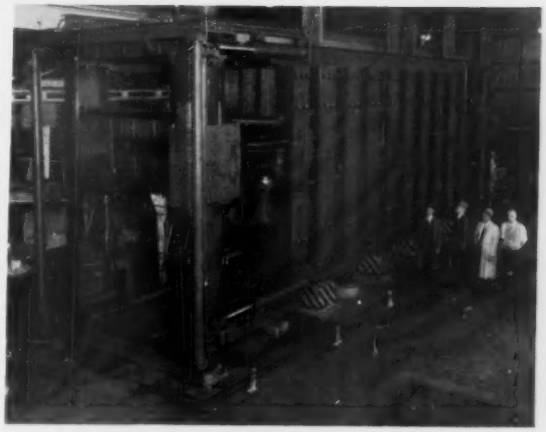
DESIGNED to handle belts up to 15 feet in diameter and 35 tons in weight, a new belt press, built by the Dominion Engineering Works Ltd., Lachine, Quebec, Canada, has recently been installed by Dunlop Canada Ltd. in their belt department at Toronto. It is 32 feet long and will cure belts up to 72 inches wide normally but 76- or 78-inch belts can be produced if required. Side irons are provided in size up to 1-⅛ inches for belts measuring up to 1-⅛ inches in thickness.

The press contains twenty 16-inch diameter rams arranged in pairs. Adjustable operating pressure gives up to 5000 tons total pressure on the platens. The top platen measures 32 feet in length, 78 inches in width and 3 inches in thickness. The dimensions of the bottom platen are the same as the top except that the bottom platen measures 84 inches in width. The extra width accomodates a blocking-in device that is of the centering type with one inch movement on each side. The device is operated manually by a ratchet lever mechanism.

In order to stretch a belt before closing the press, a stretcher, which consists of a stationary clamp at the outlet end and a movable clamp with a four foot stroke at the inlet end, has been provided. The device contains a scale which is graduated in percent stretch. The stretcher was designed so that it would not obstruct the operator's view or work at the end of the press.

A leveling gear, which consists of a heavy shaft supported in stationary bearings, runs along each side of the press. Each shaft carries three pinions which mesh with racks attached to the bolster. This insures the lower platen always being level. Two cracking cylinders at one end assist in opening the press should the belt stick to the platens.

The usual iron or steel castings used in the top and bottom crossheads are replaced by crossheads made up of two 36-inch wide flanged steel beams placed side by side, thus taking advantage of the reliability and good weight distribution of standard rolled sections. The deflection of this crosshead is less than .005-inch across the width of a 72-inch belt with full pressure on the rams.

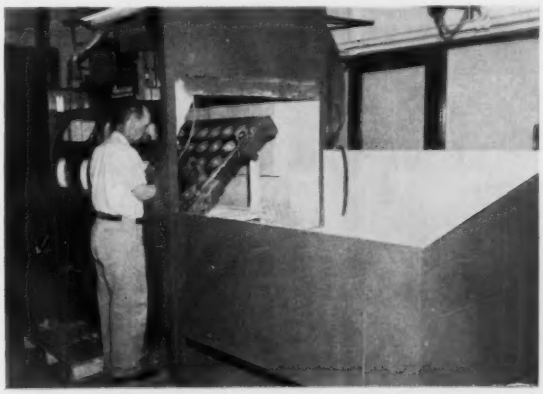


Measuring 32 feet long, this gigantic belt press, in operation at the Toronto plant of Dunlop Canada Ltd., will cure belts up to 78 inches wide.

The usual round strain rods are replaced by steel slabs four inches thick and 18 inches wide. This construction is widely used on small hydraulic presses. Platen cooling is accomplished by flooding the platens with water at the end of each cycle to reduce their temperature in order to minimize surface defects. All curing functions are automatically controlled by an electric timer.

Round Particle Abrasive Improves Wet Blasting Technique

MANUFACTURERS have long been aware of the wet blast method of mold cleaning. It is a relatively fast method, gives a uniform finish on all areas, and eliminates the various manual operations of brushing, scraping, grinding, and burning. However, in spite of these advantages, it was in only comparatively recent years that the process became completely adaptable to rubber molds used for glossy-surfaced consumer rubber goods.



Wet blast cleaning a large rubber ball mold in a Wheelabrator Liquamatte machine.

Until recent times, the abrasives available for the process all left matte surfaces characterized by dull color on the mold. This, in turn, made a similar surface on the rubber. A black rubber compound, for instance, turned out "greyish" when molded. Such color was found objectionable by manufacturers with products requiring perfect appearance for maximum sales appeal. Another consideration was that the available abrasives made the wet blast process too severe for certain molds, particularly tire mold aluminum inserts. Thus, certain things were not wet blasted.

Research has now solved both these problems with a new abrasive. Wheelabrator Corporation, Mishawaka, Indiana, which conducted the research, explains the basic difference of the new abrasive: It has a round particle character, whereas others have angular particles. The round particles produce mold surfaces that make glossy moldings.

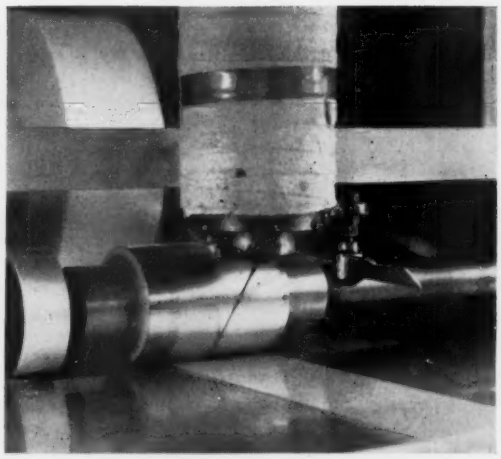
Mold performance is increased. One tire manufacturer that wet blasts his molds with the round abrasive is said to get four times as many cures off a mold now after cleaning as he did with a former cleaning method.

Molten Bead Seals Polyethylene Film Moving at High Speeds

A CONTINUOUS seal for polyethylene film produced at rates of 500 feet per minute or higher is made possible by a new molten bead sealing principle developed by the Bakelite Company, a Division of Union Carbide and Carbon Corporation. Scientists at Bakelite's Packaging Laboratory in Bound Brook, N. J., discovered the basically simple new principle. These researchers came up with the idea of feeding a continuous bead of molten polyethylene resin between layers of film to fuse them together at high speeds. Conventional methods that seal 10 mil film at a maximum rate of 25 feet per minute and 1½ mil films at 150 feet per minute apply heat from the outside. The new principle extrudes a hot filament of polyethylene between two layers of film at the point where they are to be sealed rather than attempting to drive the heat through the films.

The first bead sealer developed at the Packaging Laboratory employs a plastics extruder with a ¾-inch diameter bore and a 1/16-inch diameter die opening to produce the continuous molten bead. Polyethylene resin is heated in the extruder to approximately 250° C. and forced out at the rate of about 1½ pounds per hour. The molten bead is fed between continuously moving lengths of film travelling at speeds of 500 feet per minute or more. Just enough pressure to flatten out the molten bead between the two films is applied to rollers through which the film passes after picking up the bead.

The new technique may be used to seal polyethylene film of almost any thickness, and is applicable to the sealing of polyethylene coated paper, polyethylene laminates and paper. Although a patent has been applied for and commercial applications are being sought, no equipment is as yet commercially available for molten bead sealing.



Molten bead of polyethylene resin is fed between continuously moving lengths of film travelling at speeds of 500 feet per minute or more.

Uniformity in Closed Cell Rubber Products

THE lack of uniformity as to curing time, size of expanded sheet, hardness, color and other characteristics is a problem frequently encountered in the manufacture of closed cell rubber. It is sometimes a difficult matter to locate the exact cause or causes of the trouble, but when located the basic cause is almost always failure to recognize the fact that the processing of closed cell materials must be more closely controlled than that of the usual solid molded rubber product.

According to Rubatex Products, Inc., which maintains headquarters at 420 Lexington Avenue, New York 17, N. Y., and a laboratory at 27 Upham St., Melrose 76, Mass., it would be a difficult, if not impossible, task to detail all of the many variables that may possibly cause a corresponding variation in the closed cell rubber product. The company produces such products and also offers licenses to others for similar production. However, the company has prepared a summary of the processing steps and conditions which should receive special care and attention. This summary is as follows:

Blending of Polymer: Curing rate, moisture content and other properties will vary from lot to lot, as received.

Banbury Operation: Uniformity as to time and temperature is necessary for maximum uniformity in plasticity of stock.

Relaxation of Stock: A uniform relaxation period—24 hours after cooling—is recommended.

Addition of Blowing Agent: Whether added as a Banbury or mill operation, the mixing must be rapid and at a temperature preferably not over 200°F. to prevent variations due to loss of gas.

Blending of Banbury Batches: Blending of batches before adding blowing agent, and on warm-up mills, promotes uniformity.

Warm-up Milling and Calendering: The same considerations mentioned under Blowing Agent apply.

Mold Temperatures: The variations frequently observed in mold temperatures, as between platens and from press to press, is the most important cause of variations in the expanded sheet. Note that reference is made to actual mold temperature, not gauge pressure on the steam lines or the temperature shown by controls or indicators. These latter may be greatly in error due to poor trapping of presses and inadequate piping.

Final Vulcanization: Whether this is a press or oven cure, it must be adequate to complete vulcanization.

Heat Stabilization (Tempering): Regardless of the method of final cure, further heat treatment is required to dimensionally stabilize the product. Each sheet must be exposed on all sides to a temperature and for a time determined to be optimum for producing full shrinkage. Air circulation must be adequate.

Direct Measurement of Dynamic Bulk Modulus

AN apparatus that measures directly the dynamic bulk modulus of solids and liquids has been developed at the National Bureau of Standards, Washington, D.C. Designed primarily for studies of the compressibility of polymeric materials as a function of time or frequency of application of pressure, the instrument makes possible for the first time the study of such properties with reasonable precision over a frequency range of 50 to 5000 cps. It should thus prove useful in studying transition phenomena with time scales of the order of 0.02 to 0.0002 second. It should also prove useful in permitting measurements that will supplement ordinary P-V-T measurements on materials whose compressibility is independent of time or frequency.

The bulk modulus of a material is defined as the ratio of applied pressure to the fractional change in volume caused by this pressure. When pressure and change of volume vary sinusoidally with time, the corresponding steady state ratio is the dynamic bulk modulus. The reciprocal of the bulk modulus is defined as the bulk compliance or compressibility.

A dynamic bulk compliance so defined will consist of two parts. The real part, defined as the component of the volume change in phase with the pressure divided by the pressure, measures the energy stored during a deformation, and corresponds very nearly to the static compliance measured on application of a steady pressure. The imaginary part, defined as the component of volume change 90° out of phase with the pressure divided by the pressure, measures the energy lost during a deformation.

At the frequencies used with this apparatus, many materials, such as metals, have a dynamic bulk compliance that is independent of frequency and has nearly the same value as would be calculated from the change of volume associated with a static pressure. For other materials, such as polymers near their glass transition temperatures, the dynamic bulk compliance depends on the frequency of the test and contains an imaginary component. The existence of such an imaginary component indicates the presence, under the conditions of the test, of some basic molecular mechanism which is of fundamental interest.

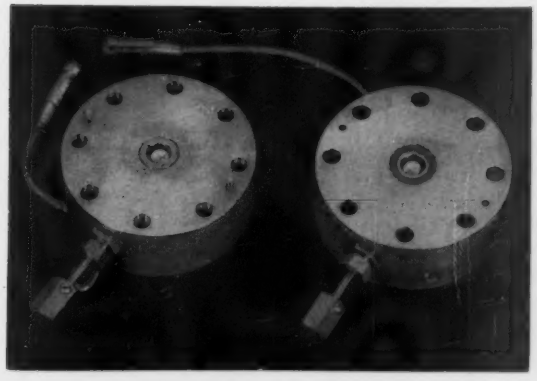


FIG. 1—The apparatus developed at the National Bureau of Standards for measuring directly the dynamic bulk modulus of polymers and other materials.

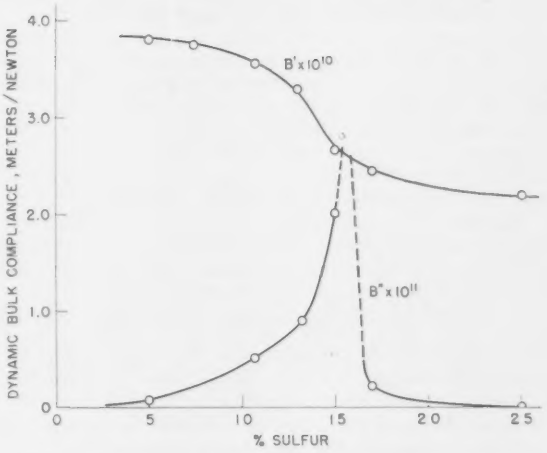


FIG. 2—Real and imaginary parts of the dynamic bulk compliance for the system natural rubber-sulfur. These curves were obtained with the bulk modulus cavity.

The chief purpose for which this apparatus was developed was to study the effect of static pressure and of temperature on the complex bulk compliance at a given frequency and by this means to investigate the basic molecular mechanism. Of secondary importance to the basic program, but perhaps of real importance in other investigations, will be evaluation of the bulk moduli of various structural materials, because the bulk and shear moduli together determine the response of an isotropic, homogeneous material to any arbitrary small stress or strain.

The apparatus consists of a cylindrical cavity, about 1.5 cm in diameter and 1.5 cm deep, inside a heavy steel block (Figure 1). Two piezoelectric crystals are mounted within the cavity, one to serve as a driver or generator of volume velocity, the other as a detector of alternating pressure. The sample to be measured is placed within the cavity and the remainder of the cavity volume is filled with an oil to act as a pressure-transmitting fluid.

When a sinusoidal voltage of about 50 volts is applied to the driving crystal, its volume changes sinusoidally with the same frequency as the applied voltage, thus changing the volume of the cavity available to the sample and confining liquid. The frequency is always kept sufficiently low that no wave motion is set up in the small cavity. Pressure is thus uniform throughout the whole cavity at any instant and is determined by the compliance of the sample and confining liquid. The apparatus is calibrated by using a sample and a confining liquid of known compressibility.

The real and imaginary parts of the dynamic bulk compliances of the sample, plus those of the transmitting liquid, plus contributions from the apparatus itself, are proportional to the real and imaginary parts of the ratio of driving to pickup voltage. These quantities are measured with an a-c potentiometer, in which the driving voltage is attenuated in two stages, one involving a phase adjustment. The attenuated voltage is then balanced against the pickup voltage, using as a null indica-

tor a high-impedance battery-operated preamplifier followed by a frequency analyzer to reduce noise. As the crystals are operated far below their resonance frequency, the pickup signal is very low—a few tenths of a millivolt—and for a good balance a null must be obtained to within less than one microvolt.

The apparatus is constructed so that a static pressure as high as 1000 atmospheres can be superposed on the alternating pressure. The alternating pressure is so low that the instrument measures a differential compliance, or a tangent to the volume-pressure curve at the particular static pressure superposed. Because of the frequency range in which it is operated, it measures an adiabatic rather than an isothermal compliance.

Because the wavelength used must be large compared to the size of the cavity, the top frequency limit is about 5000 cps. Satisfactory operation of the potentiometer imposes a lower frequency limit of about 50 cps.

In calibrating the device, steel, magnesium, and hard rubber have been used as materials of known compliance, with a vacuum-pump oil as the transmitting medium. The results on all possible pairs of these four materials (which have negligible loss under the conditions of measurement) are in excellent agreement. In fact, they agree with the compliances obtained from other measurements to within the estimated errors.

The basic measurements, corresponding to the difference in compressibility between the sample and confining liquid, have estimated standard deviations of a little under one per cent. Measurements are fairly rapid; about one day is required to cover the frequency range available and three or four different static pressures, and about the same time is required to calculate the results. The present apparatus is limited to operation at room temperature, but a modified version now under construction should be usable at any temperature between —30° and +100°C.

The present apparatus has recently been used to investigate glass transitions in the system natural rubber-sulfur, with the results shown in Figure 2. In the figure, real and imaginary parts of the dynamic bulk compliance are shown in square meters/newton ($= 10 \times cm^2$/dyne) for the system at 700 cps, 200 atmospheres static pressure, and 25°C. The upper curve represents the real part (B′) of the compliance, while the lower curve represents the imaginary part (B″). The exact location of the maximum in the lower curve is not known, so a portion of this curve is indicated by the broken line.

Results indicate that at 25°C., in the time-scale of 0.01 to 0.001 second, and at about 50 atmospheres, the "transition" between rubberlike and glasslike behavior occurs for 15 percent sulfur, as compared to 18 percent sulfur for the transition as ordinarily measured. Further experiments to evaluate this behavior more exactly will be possible with the modified apparatus since the temperature can then be varied also.

Safety Device for Horizontal Vulcanizers

RECENTLY there have been at least three serious explosions in different rubber plants caused by the door of a horizontal vulcanizer being blown off. In each instance it was found that the door had been only partially closed, possibly only a fraction of an inch, but still enough so that pressure built up in the vessel. When the lug on the door slipped from behind the lug of the vulcanizer, the door was completely blown off causing much property damage and in some instances injury to personnel.

In order to correct this situation, the Safety and Housekeeping Department of the Inland Manufacturing Division, General Motors Corp., Dayton, Ohio, has come up with a safety device to eliminate the chance for such an accident. This safety device is similar to one that has been used for a number of years by many plants to eliminate premature opening of the door. However, there is one very important change. This is in the location of the shotbolt that goes through the vulcanizer and behind the lug of the door. There has also been added a valve which prevents steam from entering the vessel unless the shotbolt is down and the door in a locked position.

Ordinary operation of the device requires that the door be closed and the lugs on the door turned until they are directly behind the lugs on the vulcanizer. The door is constructed so that it hits a stop when the lug on the door is directly behind the lug on the vulcanizer. Only then can the shotbolt be screwed down. The shotbolt goes in behind the lug and locks the door there until it is raised. The raising of the shotbolt also opens the valve that will bleed the vessel or blow a whistle to warn that there is still steam in the vessel.

Bleeding of the vulcanizer through an ordinary valve in the door is used in conjunction with this safety device. All bleeding is done through the door valve and safety valve and the whistle only operates to prevent premature opening. If for any reason the shotbolt is screwed down while the door is open the steam can be turned on but no explosion will result because the door cannot be closed.

Safety device mounted on a horizontal vulcanizer. The raising of the shotbolt opens a valve that will bleed the vessel or blow a whistle to warn that there is still steam in it.

Editorials . . .

Highway Program

THE multi-billion dollar highway program recently approved by Congress and signed into law by President Eisenhower is beginning to roll. The government has already apportioned $3,700,000,000 in Federal aid funds to the states for the program, of which $2,700,000,000 has been designated for the interstate and defense system. Activities have been organized in some ten states to secure public and legislative support at local levels for the solution of problems that might impede the progress of construction projects. At least one state—Missouri—has actually awarded a construction contract.

According to advice received from the Rubber Manufacturers Association, basic agreements necessary to carry out the gigantic highway program, which covers a thirteen year period, were recently completed by the American Association of State Highway Officials and the Bureau of Public Roads. These agreements covered finalized standards for the interstate system. Procedures and rules and regulations for the guidance of state highway departments have been issued by the Bureau. Under the formula, the traditional partnership agreements between the states and the government will prevail, with the states initiating the projects and supervising the work.

Some very interesting statistics concerning the materials which will be required for the thirteen-year program were recently prepared by the Highway Users Conference. According to these experts, the program will require 48,740,000 tons of steel, of which some 26,000,000 tons will be needed for structural shapes such as bridges, viaducts and overpasses. Although total cement requirements cannot be pinned down, it is estimated that 104,700,000 barrels a year will be used by 1959, as compared with 45,000,000 barrels used in highway construction in 1954. The requirement for asphalt, tar and naturalized asphalts is expected to reach 10,200,000 tons a year by 1960, as compared with approximately 2,000,000 tons a year currently being used. At its peak, the program will call for 775,000,000 tons of aggregate a year, against the 375,000,000 tons used in 1954.

These are impressive figures, but they take into consideration only the direct road building materials. According to the Highway Users Conference, the program will also require approximately 57,000 units of new road building machinery for each billion dollars spent for highways. Accordingly, the volume of highway equipment sales will increase 70% in the first year and up to 150 to 200% in the second year. Replacement requirements by the fifth year—or by 1961—are expected to double the demand for increased new equipment.

There is no question in our minds that the leading tire companies and some of the major non-tire companies had an inkling of some of these figures when they heartily endorsed the highway program in its formative stages, despite the fact that the construction will partially be financed by substantial new taxes on tire and tube products. The over-all impact of the program on the economy of the nation is bound to be favorable and the rubber manufacturing industry will share in the bounty. This does not only apply to the tire manufacturers, who can foresee a substantial increase in the demand for off-the-road tires, but to dozens of small, medium size and large manufacturers of molded and extruded goods which supply the myriads of rubber parts which go into the manufacture and assembly of road building machines.

It would be extremely difficult to estimate the amount of rubber for non-tire uses which will be required by machinery units needed for the gigantic highway program in the next thirteen years, but it would certainly be a very substantial figure, running into the tens of thousands. Then, again, there is every likelihood that the program will be extended far beyond its present scope. To us this adds up to the fact that the prosperity of the rubber manufacturing industry is assured for many decades to come. We may be accused of over-optimism, but facts is facts.

Growing Markets

WITH all of the attention focused on the current production-consumption figures for the GR-S type polymers, the industry is apt to overlook the position of some of the special-purpose synthetics. This was brought sharply to mind by an examination of the statistics for the July period. For example, the production of butyl rubber rose from 4,607 long tons in June to 7,181 tons. This is indicative of the fact that the production of butyl rubber could well total 75,000 long tons for the full year of 1956, a total even higher than the initial estimate of the producer. The figure for neoprene indicates that 1956 production could easily reach 100,000 long tons. Since inventories of both of these synthetics are reasonably low, the production figures will not be too far afield from actual consumption. The growing position of these materials is a tribute to the hard-hitting sales activities of the Enjay Company and the DuPont Elastomers Division.

Highlights Sidelights *of the News...*

September, 1956

The main portion of the library at the Government Synthetic Rubber Laboratory at the University of Akron has been given to the Library of the Division of Rubber Chemistry, A.C.S., which is maintained by the Division at the University . . . This gift from the National Science Foundation, the agency responsible for recommendations concerning disposition of the laboratory and its equipment, represents a substantial acquisition for the Rubber Division Library (page 989).

Edward O. Lamb, who recently fought for control of the Seiberling Rubber Co., has sent a "report" to stockholders sharply criticizing the Seiberling management . . . Mr. Lamb said the letter was in line with a promise made after his election that he would keep stockholders informed of the board's actions . . . J. P. Seiberling, company president, labeled Mr. Lamb's letter "guerrilla warfare" (page 990).

The Federal Trade Commission will shortly begin hearings on restraint-of-trade complaints against the B. F. Goodrich Co. and the Texas Co. in the sale of tires, batteries and accessories through retail gasoline stations . . . The agency will also shortly proceed with similar complaints against Goodyear, Firestone, Shell Oil and Atlantic Refining . . . The six firms are accused of violating the Federal Trade Commission Act by the payment or collection of overriding commissions (page 989).

Firestone has announced plans covering the establishment of a 3,000 acre plantation in eastern Brazil . . . It is expected that within six years the first trees will be yielding latex . . . The plantation will eventually provide raw materials for Firestone's tire manufacturing plant at Sao Paulo . . . Some 1,000 employees will comprise a permanent force at the new plantation (page 991).

The Business and Defense Services Administration of the U.S. Department of Commerce has released some interesting figures bearing on rubber industry employment according to states . . . As was to be expected, Ohio ranks first in the number of employees actively engaged in the rubber industry, followed by Massachusetts, California, Indiana and New Jersey, in that order . . . The report shows that rubber manufacturing is carried on in 38 states (page 995).

It is generally agreed that outlays for plant expansion and improvement by the rubber industry since the end of World War II have been substantial . . . Standard and Poor's Corp. have now made figures available showing the extent of these capital expenditures for a group of selected companies covering the years 1945 to 1955 (page 1010).

NEWS REPORTS and Industry Activities

GOVERNMENT LABORATORY LIBRARY GIVEN TO ACS RUBBER DIVISION

The bulk of the contents of the library at the Government Synthetic Rubber Laboratory in Akron, Ohio, has been given to the Library of the Division of Rubber Chemistry, A.C.S., which is maintained by the Division at the University of Akron. This gift from the National Science Foundation, the agency responsible for recommendations concerning disposition of the Laboratory and its equipment, represents a substantial acquisition for the Rubber Division Library.

The principal portion of the gift consists of approximately 4,000 CR Reports, the basic copolymer research reports written under the auspices of the Rubber Reserve Corp., and its successor agencies. Other important items are a complete set of Chemical Abstracts in 50 volumes plus 26 volumes of author, title, subject and patent indexes; a complete set of Beilstein's Handbuch der Organischen Chemie in 74 volumes; and a complete set of the Rubber Formulary.

A valuable file of summary cards prepared by Government Laboratory personnel covering progress reports relating to the war-time and post-war synthetic rubber program was given to the Rubber Library. Microfilms of all Rubber Reserve CD Reports, the Alien Property Custodian's PB Reports, and many reels of patents relating to synthetic rubber were also acquired.

All of the cabinets and card files needed to hold the reports and summary cards were included in the gift, obviating the necessity of a considerable expenditure by the Rubber Division.

Recent announcement of this important gift climaxed five months of effort by Dr. Norman Auburn, president of the University of Akron; Dr. B. S. Garvey, Jr., vice-chairman of the Rubber Division, and Ralph F. Wolf, chairman of the Division's Library Policy Committee.

"Paraplex G-62," produced by the Rohm & Haas Co., Philadelphia, Penna., has been approved by the Food & Drug Administration and the Meat Inspection Branch, U.S. Department of Agriculture for use as a plasticizer in compounds utilized in the packaging and conveying of food products.

Another RUBBER AGE Service

As an added service to our readers, RUBBER AGE has initiated, with this issue, a new method of presenting foreign news developments under the heading "Overseas." While we have always paid full attention to foreign news, we have now undertaken, through the exclusive services of the Reuter's News Agency, to considerably expand this coverage. Through the world-wide facilities of the Reuter organization, we will be able to add new insights to foreign news developments. Foreign news items of interest will continue to appear in our regular news columns as well as in the "Overseas" columns.

Cabot Foundation Scholarships

As part of the widespread Cabot scholarship program, seven southwestern colleges will receive scholarships from the Cabot Foundation, Inc., this fall, it was announced recently. The Foundation, formed by Godfrey L. Cabot, Inc., and members of the Cabot family for the purposes of aiding charitable, educational, religious, and scientific organizations, will award grants to one student in the fields of chemical, mechanical, or petroleum engineering or geology at each of the following: Louisiana State University, The University of Texas, Texas Technological College, Southern Methodist University, Rice Institute, Texas Agricultural and Mechanical College, Oklahoma Agricultural and Mechanical College. The scholarship student will be chosen by a committee at each school on the basis of his scholastic record, personal qualifications, and financial need. Summer jobs with the Cabot industries may be offered these students to provide them with the opportunity to supplement their class room education with on-the-job experience; at no time, however, will the students be obligated to accept positions with Cabot. Through this scholarship plan Cabot industries hope to play a part in overcoming the serious shortage of scientifically and technically trained people which exists today.

FTC TO BEGIN HEARINGS ON RESTRAINT OF TRADE CASES

A Federal Trade Commission official said recently that the agency will begin hearings in four to five weeks on restraint-of-trade complaints against the B. F. Goodrich Co. and the Texas Co. in the sale of tires, batteries and accessories through retail gasoline stations. Exact hearing date—late in September or early October—will be set shortly at the last of a series of prehearing conferences between attorneys for both sides and an FTC examiner. The meeting is also expected to decide hearing locations, with New York, Chicago, Akron and Dallas mentioned in discussions to date.

Meanwhile, the agency expects to proceed sometime in September with similar complaints against the Goodyear Tire & Rubber Co., Firestone Tire & Rubber Co., Shell Oil Co., and the Atlantic Refining Co. Separate prehearing conferences on the complaints against these companies should get underway before the Goodrich-Texas hearing begins. FTC examiner Earl Kolb is handling all of the complaints.

The six firms are accused of violating the Federal Trade Commission Act by the payment or collection of "overriding commissions" in the sale of the tires, batteries and accessories through stations handling the oil company products. The oil companies, however, insist they earn the commissions through legitimate sales promotion efforts and have denied coercing dealers handling their brand products.

Glidden Dissolves Subsidiary

Glidden Co., Cleveland, Ohio, has dissolved the corporate entity of its wholly owned subsidiary, E. W. Colledge G.S.A., Inc., and consolidated its activities with those of the Southern Chemical Division. Paul E. Sprague, vice-president in charge of the Southern Chemical Division, said operations will be continued from the former Colledge offices in Jacksonville, New York, Cleveland, Chicago and San Francisco. The Colledge firm was organized in 1926 and for 30 years was the sole sales agent for products manufactured from destructively distilled wood by the American Turpentine & Tar Co., New Orleans, La., and by Glidden's former Naval Stores Division (now Southern Chemical).

LAMB REPORT RENEWS ATTACK ON MANAGEMENT OF SEIBERLING RUBBER

Edward O. Lamb, who recently fought for control of the Seiberling Rubber Co., Barberton, Ohio, has sent a four-page, single-spaced "report" to stockholders sharply criticizing Seiberling management. President J. P. Seiberling labeled Mr. Lamb's letter "guerrilla warfare." This was the first word from Mr. Lamb since he and three associates were elected to the recently enlarged 11-man board after a bitter proxy contest in April.

Mr. Seiberling, who, as a stockholder, received a letter, said, "It was hoped that following his overwhelming defeat by Seiberling stockholders in the recent proxy contest for control of the company that he would endeavor to be cooperative and constructive as he promised." Mr. Seiberling said the letter is indicative of Mr. Lamb's capacity to "mislead, misinform, distort and confuse."

Mr. Lamb said the letter was in line with a promise made after his election that he would keep stockholders informed of the board's actions. At the first board meeting he attended May 11, Mr. Lamb said three actions were taken. The first action was Mr. Seiberling's suggestion that his own salary and that of certain other executives be raised. The second "accomplishment" was to change the title of H. P. Schrank from vice-president to executive vice-president, Mr. Lamb said. The third action "was a motion by J. P. Seiberling to eliminate the June directors' meeting so he could take an extended vacation," the Lamb letter stated.

Cites McGrath Resolution

Mr. Lamb told of resolutions offered by J. Howard McGrath, another director, to employ an outside consulting firm to review and improve the operation of the company and to appoint an officer to make recommendations on diversification. No action was taken on either matter in May, he added. Mr. Lamb's letter also discussed the financial problems of the company, proxy contest expenses, a study of possible legal actions to recover a fee paid to a public relations firm whose contract was not submitted or approved by the board, a Canadian subsidiary, and the Colombian plant in which Seiberling has a 25% interest.

In his reply to Mr. Lamb's letter, Mr. Seiberling said that Mr. Lamb's minority report to stockholders was set off because directors turned down a $54,000 bill for Mr. Lamb's proxy fight expenses. Mr. Seiberling told stockholders that Mr. McGrath had promised that things would go 'much more smoothly" if the board would vote to pay the bill. Mr. McGrath's resolution to pay the expense was defeated, Mr. Seiberling said, and "then the trouble started." "Until that moment there was harmony," he said. "After that, the Lamb directors turned the (July 26) meeting into near turmoil. And Mr. Lamb's recent letter apparently is another result."

In his 'report" letter, Mr. Lamb had criticized officer changes, salaries, and other board actions in meetings on May 17 and July 26. But Mr. Seiberling said Mr. Lamb and his directors voted unanimously for these actions. "Not a word of criticism was heard concerning any of the matters in Mr. Lamb's letter," he said. "We were astonished to read Mr. Lamb's statement in the newspapers that 'the problems of the Seiberling Rubber Co. are acute' and that there is a danger the company may be 'taken over by the banks'," the company president said. "Such an unwarranted, irresponsible statement is unfortunate coming from any source. Coming from a board member, it is almost incredible. The facts are exactly opposite," Mr. Seiberling declared.

Problem of Working Capital

The company's growing business calls for more working capital, Mr. Seiberling said, and "this is our biggest 'problem.' New financing to solve it, and to further strengthen the financial structure, is one of the first orders of business for the board. We are working actively on it at this moment." Mr. Seiberling said officer salary increases, which Mr. Lamb criticized in his letter, were the first in three years, and that Mr. Lamb and his associates voted for them. The increases for all officers totaled $26,700 per year.

Mr. Lamb's proxy expense bill included $30,199 for "legal and professional services," $17,566 for "staff services and expenses," $5,925 for "materials," and $1,291 for "brokers charges," according to Mr. Seiberling's letter. "It appeared to the majority of the directors that the board could not, in good conscience, vote stockholders' money to pay Mr. Lamb's expenses for the proxy fight he started—in which stockholders overwhelmingly rejected his bid for control," Mr. Seiberling said.

The Toledo attorney received proxy votes of less than 6% of outstanding shares not owned by himself or his group, Mr. Seiberling reminded stockholders, pointing out that "out of 1,869 stockholders of record, a total of only 43 cast their ballots for the Lamb slate."

Explains Schrank Promotion

Mr. Seiberling went on to say that: "Mr. Lamb says H. P. Schrank's 'title' was changed to that of executive vice-president. The truth is that Mr. Schrank was promoted to this position and given much greater responsibilities as chief operating officer, in order to permit the president to devote more time to problems of expansion, diversification, and financing. Mr. Lamb praised the action. He and his associates voted for it.

"Mr. Earl A. Hensal, formerly manager of the B. F. Goodrich Co. Akron plant, was elected vice-president of Seiberling, in charge of production, engineering, development and purchasing —responsibilities formerly held by Mr. Schrank. Mr. Lamb and his associates voted in favor of this action."

New York Golf Tournament

The New York Rubber Group held its Annual Golf Tournament on August 2 at the Innis Arden Golf Club, Old Greenwich, Conn. A full day of golfing was arranged and luncheon and dinner were served. Herbert J. Due (St. Joseph Lead), vice-chairman of the New York Rubber Group, served as chairman of the Golf Committee with Lester J. Koch (Westwood Chemical) as treasurer. Other members of the Golf Committee included D. B. Doherty (Godfrey L. Cabot), C. J. Lewis, R. De Turk (Whittaker, Clark & Daniels), M. Gall (Luzerne Rubber) and J. E. Walsh. Approximately 230 members and guests attended the affair of whom about 190 participated in the tournament. The tournament marked the opening of competition for the new 'Nesbit Cup" donated by Jean H. Nesbit (National Polychemicals). The original Nesbit Cup has been permanently awarded to Vincent Lake after he won three separate tournaments. The first leg up on the new Nesbit Cup was won by F. Salamon with a low gross of 75. Other low gross winners included: J. F. Wernersbach, W. B. Curtis, C. Withington, R. E. Nippes and C. Basilone. Winners of other events were as follows: *Closest to Pin on 7th Hole*— R. Hurst; *Kickers' Handicap*—J. Starin, O. Garlick, W. Tepper, E. R. Friese, F. Chittenden, C. Basilone, R. Hurst, J. Tumpeer and D. Fish. *High Gross*—E. T. McBride. Prizes were also awarded to those participants scoring birdies. Door prizes were distributed to those holding lucky numbers. This was the first time that the Annual Golf Tournament was held at Innis Arden, and members were well pleased with the course and with the general arrangements for the day.

Dow To Build Catalyst Plant

Dow Chemical Co., Midland, Mich., has announced plans to build a $2,000,000 plant addition at Ludington, Mich., to produce a catalyst used in making synthetic rubber. The addition, which will have 36,000 square feet of floor space, will employ 50 to 60 persons initially. Construction is scheduled to begin late this year and the plant is expected to be in production by the end of next year. The catalyst to be produced at the plant is used to prepare butadiene. Dow has been producing it in smaller quantities at its Midland facilities since 1945.

Plans Nigerian Footwear Plant

H. W. Rollman, president of Wellco-Ro-Search, Waynesville, N. C., has announced that an affiliation agreement for a footwear plant in Nigeria, West Africa has been concluded. The plant plans an initial production of 1,000 pairs of shoes per day with sponge rubber soles. Also scheduled for initial production are 1,000 pairs of tennis shoes per day to be made in the Wellco-Ro-Search molded construction. Within two or three years, the plant also plans to begin production of leather shoes with molded rubber soles.

RUBBER PLANTATION IN BRAZIL ANNOUNCED BY FIRESTONE TIRE

Byron H. Larabee, president of the Firestone Plantations Co., has announced that a rubber plantation that initially will extend more than 3,000 acres in eastern Brazil is being established by the Firestone Tire & Rubber Co., Akron, Ohio. Within six years, the first trees will be yielding latex to be tapped by the vanguard of a permanent work force that will number approximately 1,000, the announcement said.

The plantation is being established on 12,500 acres of land near Itubera in order to provide raw materials for Firestone's tire manufacturing plant in Sao Paulo, 1,400 miles to the south, and to other rubber products plants in the South American country. The site was chosen because of the availability of labor, plentiful rainfall, even climate, nearness to ocean transport and hydroelectric power and the rich soil.

The land was surveyed for Firestone in early 1954, and since the end of that year more than 700 acres have been cleared and some planted with high-yielding rubber trees brought to Brazil from the Firestone plantations in Liberia, West Africa. The staff at the new plantation is headed by Bert O. Vipond, formerly plantation manager of the Liberian plantation. The staff also includes accountants, engineers, a physician and surgeon. The tract includes land that was a sugar plantation years ago. The plantation, roughly rectangular, covers the floor of a long valley bordered by timbered hills. One boundary is the Rio Serinhaem. At the base of the 200-foot falls is a hydroelectric plant that provides power for Itubera, local industry and the plantation.

Across the river from the power plant, the company plans to build a rubber processing factory, where liquid latex will be preserved for shipment or coagulated and processed into sheet rubber. From the factory, rubber will be trucked to the Firestone warehouse at Itubera, where a concrete dock capable of handling ships up to 1,000 tons has been in operation for several years. Rubber will be loaded on small vessels there, then transferred to larger ships at Salvador for the voyage to Santos, near Sao Paulo.

Representing Wallace Instruments

Arrangements have been concluded between H. W. Wallace & Co., Ltd., of Croydon, England, and Testing Machines, Inc., 123 West 64th St., New York 23, N.Y., under which the latter organization will handle the sale, distribution and maintenance of the complete Wallace line of instruments in the United States. The line includes the company's micro hardness tester and the micro indentation tester, both of which are finding widespread application in the rubber and plastics industries. Both the British and American firms have long been established. Testing Machines, Inc., has been in business over thirty years specializing in physical testing equipment for various industries. The addition of the Wallace line will enable the company to include a wide range of rubber testing instruments. W. F. Bachelder is vice-president of the company.

GUNDAKER AND CALLAHAN ELECTED VICE-PRESIDENTS OF GOODRICH TIRE

Guy Gundaker, Jr.

J. T. Callahan

The election of Guy Gundaker, Jr. and J. T. Callahan as vice-presidents of the B. F. Goodrich Tire Co., Akron, Ohio, has been announced by E. F. Tomlinson, president. Mr. Gundaker, formerly field sales manager of the tire company, has been named vice-president, replacement tire sales. Mr. Callahan, who has been district manager of Goodrich equipment sales with headquarters in Chicago, Ill., has been appointed vice-president, equipment sales.

Mr. Gundaker joined the company in 1925 directly from Cornell University. His first assignment was in sales in Philadelphia, Penna. Completing 30 years of service in 1955, he has held managerial positions in tire sales, advertising and merchandising. He was resident manager of B. F. Goodrich participation in the New York World's Fair, returning to Akron as manager of sales promotion. He later managed the Automotive Accessories and Retail Store Administration Departments before being named field sales manager of replacement tire sales.

Mr. Callahan, a native of Van Buren, Okla., joined B. F. Goodrich in 1928 and served in sales capacities in Dallas, Tex., and New Orleans, La., before being transferred to company headquarters in Akron in 1938. Prior to becoming district manager of equipment sales in Chicago in 1942, Mr. Callahan had been engaged in special assignments in the company's production of military products for the armed forces.

Black-Reinforced Silicone

In recent Air Force research, silicone rubber has been successfully reinforced with carbon black, previously effective only with hydrocarbon rubbers, according to a report released through the Office of Technical Services, U. S. Department of Commerce. During tests on a new silicone polymer, Linde W-96, a dimethyl siloxane modified with a small number of active vinyl groups on the side chains, carbon black was introduced as a filler after the gum was vulcanized with di-tertiary-butyl peroxide. A firm, well-reinforced rubber was produced. Prior to the experimentation, carbon black fillers had hampered curing action, evolved gas at high temperatures and provided poor reinforcement in silicone rubber. Only the so-called "white" fillers, such as silica, calcium carbonate and titanium dioxide, produced satisfactory reinforcements. The report, PB 121231 "Reinforcement of Silicone Rubber with Carbon Black," by A. J. DeFrancesco, may be ordered from OTS, U. S. Department of Commerce, Washington 25, D. C. It contains 33 pages, price $1.00.

Another copy of RUBBER AGE needed in your office? Use the coupon on page 1065.

Bridgwater 50th Anniversary

Bridgwater Machine Co., Akron, Ohio, is currently celebrating its 50th anniversary. Half a century ago, Bridgwater began machining and assembling, under contract, components and complete units for other manufacturers—and contract manufacturing has been its principal activity since. Today, the company, with divisions in Athens, Ohio, and Brantford, Ont., Canada, is one of the largest, most completely equipped firms whose primary activity is contract manufacturing. Bridgwater has been closely associated with the tire industry since the beginning of its operations and has developed fast, economical methods of manufacturing tire molds as well as semi-automatic precision machines to engrave tread designs accurately and quickly. Through the years, the demand for tire molds manufactured by Bridgwater so increased that the company established the Athens machine Co. at Athens, Ohio, as a subsidiary. Here, the finest quality tire molds of every size and type are produced in steel, cast iron or aluminum. The Athens plant is said to be the only plant in the world devoted exclusively to tire mold manufacture. In addition to its activities in the tire industry, Bridgwater is also active in the railroad, aircraft and other fields.

CENSUS BUREAU RELEASES PRELIMINARY REPORT ON TIRES AND TUBES

During 1954, manufacturers in the tire and inner tube industry shipped products valued at $1,842,000,000 an increase of 19% over 1947, according to preliminary results obtained from the 1954 Census of Manufactures conducted by the Bureau of the Census, Department of Commerce. Average employment in this industry, however, has dropped 20% since 1947 (when the last Census of Manufactures was taken) to a total of 92.7 thousand employees in 1954. Value added by manufacture in the industry amounted to $845,000,000 in 1954, an increase of 30% over 1947. "Value added" is derived by subtracting the cost of materials, etc., from the value of shipments. It avoids, therefore, the duplication in the value of shipments which results from the use of products of some establishments as materials by others and is the best measure available for comparing the relative economic importance of manufacturing among industries and geographic areas, the report states.

The tire and inner tube industry represents manufacturing establishments engaged primarily in the manufacture of pneumatic casings, inner tubes, and solid and cushion tires (including seconds) for all types of vehicles, including off-the-road vehicles such as road building machinery, logging equipment, etc. Establishments primarily engaged in manufacturing camelback and tire repair materials or rubber tiring for baby carriages, bicycles, etc., or in producing factory rebuilt or retread tires are classified in Industry 3099, "Rubber Industries, Not Elsewhere Classified". The industry classification for tires and inner tubes, used in the 1954 Census of Manufactures is based on the *Standard Industrial Classification Manual, Volume I, Manufacturing Industries,* 1945 edition.

Value of Shipments Reported

The value of shipments, as reported by establishments classified in the tire and inner tube industry, consisted not only of products described above as primary to the industry, but also included the value of secondary products (which are primary to other industries). The $1,842,000,000 total value of shipments reported by establishments classified in Industry 3011, Tires and Inner Tubes, consisted of $1,839,000,000 manufactured products and $3,000,000 miscellaneous receipts for contract work, research and development, sales of scrap, etc.

The $1,839,000,000 product shipments were accounted for by $1,612,000,000 of tires and inner tubes and other products primary to the industry, and $227,000,000 of products primary to other industries (e.g., mechanical rubber goods, camelback, fabricated plastic products, and parts and accessories for motor vehicles). Thus, the industry's shipments of tires and tubes represented 88% of its total manufactured product shipments (primary and secondary). This figure describes the 'primary product specialization ratio", that is, the extent to which plants classified in an industry "specialize" in making products regarded as primary to the industry. The 1947 primary product specialization ratio for the industry was 90.

The industry's total value of shipments should be clearly distinguished from the total value of primary products of the industry shipped by all producers. The latter figure indicates that $1,622,000,000 value of tires and tubes and other products primary to Industry 3011 were shipped by all producers. Of this total, 99% was shipped by plants classified in Industry 3011, while the remainder was shipped as secondary products by plants classified in other industries. The figure 99% is known as the "coverage ratio", that is, it measures the extent to which all shipments of primary products of an industry are "covered" by plants classified in that industry, as distinguished from secondary producers elsewhere.

General Statistics Defined

The general statistics (employment, payrolls, cost of materials, value of shipments, etc.) are reported for each establishment as a whole. Aggregates of such data, for an industry reflect not only the primary activities of the establishments in that industry, but also their activities in the manufacture of secondary products and receipts for their other activities (contract work on materials owned by others, repair work, etc.). This fact should be taken into account in comparing industry statistics with product statistics which show the shipments by all producers of the primary products of the industry.

More detailed figures for this industry will appear later in the Census Bulletin, MC-30A, "Rubber Products", which will be published and offered for sale at a later date by the Superintendent of Documents, U. S. Government Printing Office. Also, in this bulletin, there will be a comprehensive discussion of such concepts as "industry", "establishment", "secondary production", as well as the various statistical items such as "employment", "value added", etc. Similar advance reports and final bulletins will be issued for other industries during the coming months.

Producing New Deep-Tread Tire

Dayton Rubber Co., Dayton, Ohio, has introduced a new deep-tread truck tire made with the highest tensile strength rayon available. Called the "Dayton Thorobred Deep Skid," the tire features 50% deeper tread and a carcass of 2200 denier Super Cordura rayon. Although it is nearly one-third stronger than conventional truck tires, it is said to be lighter and cooler running. The Deep Skid was developed for the rugged conditions of long, heavy-load runs at sustained speeds and is said to give up to 55% more mileage, more recaps and superior traction, the company claims.

Galex Pellets in Production

Production of a free-flowing, non-oxidizing, pelletized rosin on a commercial scale at the new processing plant of the G and A Laboratories, Inc., Savannah, Ga., has been announced by William L. Hopkins, Jr., secretary and treasurer. The product is known as "Galex Pellets." Galex Pellets are a new product resulting from a research program that G and A has been carrying on for the past two years. They are free flowing and can be easily poured from their shipping or storage container. The pellets do not fuse at temperatures up to 130°F, and they do not cake under pressure when stored in stacked bags. Mr. Hopkins described the new plant as an addition to G and A's main Savannah works. The pelletizer has a production capacity of 2500 pounds per hour and is designed for continuous processing. In operation, the plant simultaneously makes pellets of the rosin and conditions the pellets to prevent fusion at elevated temperatures. The research that created the new rosin form, known as Galex Pellets, was carried out at Battelle Institute, Columbus, Ohio. Institute technologists also designed the new plant and assisted G and A during construction. The pellets are marketed by the Thiokol Chemical Corp., Trenton, N. J.

Certifies Silicone Gums

Certification of batch-to-batch uniformity of silicone rubber gums has been put in effect by the Silicone Products Department of the General Electric Co., Waterford, N. Y. This certification program is said to be the first of its kind in the silicone rubber industry. More than 30 quality control tests are required during the various stages of manufacture before certification of gum batches shipped from the department's plant at Waterford. Each pail of gum which has passed the rigid test is identified by a large gold "Certified Uniform" sticker and a quality control laboratory serial number. The stickers read: "We hereby certify that this batch of gum has passed rigid quality control tests in our plant and that it conforms to G-E standards of quality and uniformity". The sticker is a striking seven-inch gold seal bearing the General Electric monogram and G-E signature, and saying: Silicone Rubber Gum, Certified Uniform. The certification statement and quality control number appear on the simulated ribbons below the seal.

DuPont Technical Reports

The Elastomers Division of E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del., has released four new technical reports, copies of which are available from the company. The titles of the reports are:

"Econcomical, Bright Colored Stocks with Blends of Hypalon 20 and Rubber" (Report BL-309).

"Antox: A Superior Antioxidant for Heat Resistant Hypalon 20 Stocks" (Report BL-310).

"Hypalon Wire and Cable: Properties of General Purpose Insulation" (Report BL-311).

"Compounding Non-Marking Neoprene Heels and Soles" (Report BL-312).

LONDON SYMPOSIUM PLANNED ON EXTRUDED RUBBERS AND PLASTICS

Rubber and Plastics Age of London, England, has announced plans for a symposium on "Extruded Rubbers and Plastics—Including Plastic Pipes" which will be held on October 30 and 31 at the National College of Rubber Technology in London, England. It is the purpose of this symposium to present information on the different types of extruded rubbers and plastics in current use, and to suggest new applications in industry. Sir Miles Thomas will serve as chairman for the symposium. The following program has been announced:

"The Extrusion of Natural and Synthetic Rubbers" by E. H. Hurlston (Dunlop).

"PVC Materials for Extrusion" by G. H. Burke (British Geon).

"Application and Testing of Rigid PVC and Nylon Pipes for Conveyance of Fluids" by D. J. Van Wijk (Plastics Research Institute—Delft).

"Extrusion Characteristics of Polyethylene" by D. Grant (I.C.I. Plastics Division).

"Marlex 50—Properties and Applications" by Dr. J.J.P. Staudinger (British Resin Products).

"Extruded Sheet—to Include Vacuum Forming Applications" by E. L. Williams (Saro Laminated Wood Products).

"Extruded Film for Packaging" by A. Walker (BX Plastics).

"Extrusion Equipment" by H. M. Whitcut (Fawcett Finney).

A registration fee of about $3.00 will be charged. Those desiring to attend the symposium should contact Rubber & Technical Press, Ltd., 147 Grosvenor Road, Westminster, London, S.W. 1, England.

PRESENT AND PROJECTED CAPACITIES OF BUTADIENE AND SYNTHETIC RUBBER PLANTS

The First Report of the Attorney General of the United States on Competition in the Synthetic Rubber Industry, recently presented to Congress, contained some interesting statistical information on present and projected capacities of current butadiene and GR-S type rubber plants. As this type of information is of value to many in the rubber industry, it is presented herewith:

BUTADIENE PLANT CAPACITIES

Company	Capacity as of Disposal Short Tons	Capacity as of Disposal % of Total	Total Expanded Capacity to be Completed in 1957 Short Tons	Total Expanded Capacity to be Completed in 1957 % of Total
Copolymer Rubber & Chemical Corp.	23,000	4.2	23,000	3.2
Petro-Tex Chemical Corp.	90,000	16.4	170,000	23.7
Goodrich-Gulf Chemicals, Inc.	95,000	17.3	95,000	13.2
Texas-U. S. Chemical Co.	95,000	17.3	95,000	13.2
Humble Oil & Refining Co.	46,000	8.3	62,000	8.7
Petroleum Chemicals, Inc.	63,000	11.5	79,000	11.0
Phillips Chemical Co.	74,000	13.5	112,000	15.6
Shell Chemical Corp. / Standard Oil Co. of California)	63,000	11.5	82,000	11.4
Total	549,000	100.0	718,000	100.0

GR-S TYPE PLANT CAPACITIES

Company	Capacity 5/1/55 Long Tons	Capacity 5/1/55 % of Total	Capacity 12/31/55 Long Tons	Capacity 12/31/55 % of Total	Capacity After Expansion 1956-57 Long Tons	Capacity After Expansion 1956-57 % of Total
American Synthetic Rubber Corp.	44,000	6.0	50,000	6.2	50,000	5.0
Copolymer Rubber & Chemical Corp.	49,000	6.7	56,300	6.9	67,600	6.7
Firestone Tire & Rubber Co.	129,600	17.7	167,000	20.5	190,000	18.8
Goodrich-Gulf Chemicals, Inc.	90,000	12.3	112,500	13.8	123,000	12.2
Goodyear Synthetic Rubber Corp.	114,800	15.6	127,000	15.6	186,000	18.4
Phillips Chemical Co.	63,000	8.6	54,100	6.7	108,000	10.7
Shell Chemical Co.	89,000	12.1	89,000	11.0	100,000	9.9
Texas-U. S. Chemical Co.	88,000	12.0	91,000	11.2	111,600	11.0
United States Rubber Co.	22,200	3.0	22,200	2.7	30,000	3.0
United Rubber & Chemical Co.	44,000	6.0	44,000	5.4	44,000	4.3
Total	733,600	100.0	813,100	100.0	1,010,200	100.0

Sun Celebrates 33rd Anniversary

As part of its 33rd Anniversary Program, the Sun Rubber Co. of Barberton, Ohio, held an outdoor ceremony on August 9 honoring 16 members of the Thirty Year Club. The 16 members chose the occasion to present their firm with its first company flag. Some 700 company employees participated in the festivities. T. W. Smith, Jr., president of the company, in accepting the flag, predicted a bright future for Sun Rubber, pointing out the fact that America's millions are spending billions for the kind of leisure time play products Sun Rubber makes and the market is getting bigger all the time.

British Scientist Visits U. S.

Leonard Mullins, chief, physics, British Rubber Producers' Research Association attended the 1956 sessions of the Gordon Research Conferences in Chemistry at Colby Junior College, New London, N. H. Mr. Mullins, who is well-known in European and American research circles for his work in natural rubber physics, spoke on some of the work going on at the natural rubber labtoratories at Welwyn Garden City, England. While in this country, he also visited colleagues in Canada, Akron, and a number of other cities in the United States.

Increasing Butadiene Production

Texas-U.S. Chemical Co. and Goodrich-Gulf Chemicals, Inc., have announced plans for increasing butadiene production by 50% to 300,000 tons yearly at their Port Neches, Tex., plant. Work on the expansion has already begun, and some of the increased production will be realized late in 1957. Full production from the new facilities is scheduled for the fall of 1958. Expansion of the plant is expected to help relieve a shortage of butadiene, the company reported. Texas-U.S. Chemical and Goodrich-Gulf each purchased half interest in the plant from the government in 1955 at a total cost of $53,000,000.

Pike Purchases T. A. Desmond

S. J. Pike & Co., Inc., has announced the purchase of all the capital stock of T. A. Desmond & Co., Inc., also of New York City. T. A. Desmond Co. will continue its business as heretofore, as importers, exporters, and traders in foreign and domestic commerce, specializing in the import of natural rubber. The names of Pike and Desmond are somewhat synonymous in that there was an association between the two for 22 years up to the time of T. A. Desmond, Sr.'s death.

Recent Goodrich Appointments

B. F. Goodrich Co., Akron, Ohio, has announced a number of appointments of interest. Fred N. Lehmann has been named Akron tire plant superintendent for the B. F. Goodrich Tire Co. Mr. Lehmann comes to his new post from staff superintendent of Goodrich Tire. He has been with the Goodrich organization for 16 years. Thomas H. Smith has been appointed manager of the Chemicals and Pigments Purchasing Department of the B. F. Goodrich Co. With the company since 1949, he served as purchasing agent at the Miami, Okla., plant until his present appointment. Thomas J. Cook has been named manager of engineering for Goodrich Tire. Mr. Cook moves to his new position from the tire manufacturing plant in Los Angeles, Calif., where he has been plant engineer. He has been with the Goodrich organization since 1950.

Eagle Pencil To Move

Eagle Pencil Co., located at Fourteenth Street and Avenue C in New York City since 1877, has announced plans to move to Danbury, Conn. A new plant is scheduled for completion in Danbury by 1960, according to an announcement by Henry Berol, vice-president.

Eide Celebrates 40th Anniversary

A. C. Eide

A. C. Eide, vice-president and director of the American Zinc, Lead & Smelting Co., Columbus, Ohio, celebrated his fortieth anniversary with that company on August 1. Mr. Eide joined the American Zinc organization as a chemist at Hillsboro, Illinois. In 1919, he was made branch manager of the Chicago sales office, and in 1923 came to Columbus as sales engineer of the American Zinc Oxide Co. He was named manager of the Pigment Division of the company in 1940, which included management of the company's plant at Hillsboro, as well as Columbus. Mr. Eide was made vice-president of the American Zinc Oxide Co., and the American Zinc Sales Co. in 1944. He was elected vice-president of the parent company in 1950 and was elected to the board of directors of the American Zinc, Lead & Smelting Co. in February, 1954.

Well known in both the rubber and paint industries, Mr. Eide is a recognized authority on the manufacture and use of zinc oxide. He is the author and co-author of several technical papers on the use of zinc oxide. He is a graduate of the University of Illinois with a B.S. degree in chemical engineering. Mr. Eide is a member of the American Chemical Society, its Rubber Division and the Akron Rubber Group. He is also a member of the American Ceramic Society, the American Society for Testing Materials, and other technical groups.

Use of Esso Method Growing

Plant facilities now under way in Texas will boost to more than 400,000 short tons a year the world-wide production capacity of butadiene by the patented extraction and purification process developed by the Esso Research and Engineering Co. The newest licensee for the process is the Firestone Tire and Rubber Co. of Akron, Ohio. Firestone is building a plant near Orange, Texas, which will produce 40,000 short tons of butadiene a year. There are nine other firms which are now or soon will be producing butadiene by the Esso Research-developed process. These include three companies outside the United States. Eight contractors are authorized to design and build butadiene extraction plants.

Various Price Increases Set

A number of significant price increases covering a wide range of products have been announced by various rubber companies over the past few weeks. Goodyear, for example, has announced a 3% price increase on rubber soles and heels and all Neolite products sold to shoe manufacturers. The company has also increased prices on products in its industrial rubber goods line. All hose prices have been increased in a range between 3 and 5%. The price of flat transmission belting has been advanced by 2½% and conveyor and elevator belting by 3%. V-belt prices have been increased from 4 to 5% with the exception of steel cable V-belts which are priced at former levels or slightly lower depending on type. Dayton Rubber has announced that all lines of power transmission V-belts have been increased from 3 to 6%. Goodrich has also announced a 3% price increase on all types of rubber heels and soles and 2½ to 5% increases in prices on all types of belting. Hewitt-Robins has announced 2 to 5% increases in the prices of its conveyor belting. The primary reason given for the advances by all companies was the increased cost of labor. It is expected that other companies producing similar lines of products will also announce price increases comparable to those already established.

Australian Synthetic Plant

According to A. C. Pullen, industrial chemical manager of Shell Chemicals (Australia) Ltd., Melbourne, Australia may enter the field of synthetic rubber production before too many years. Mr. Pullen said the establishment of a synthetic rubber plant would be of prime strategic importance to Australia in time of war, when raw rubber supplies might be cut off. The Commonwealth Government is reported to be interested in synthetic rubber production. Mr. Pullen said that the two basic ingredients of synthetic rubber could easily be produced now that Australia has her own refineries.

LABOR NOTES

A new contract granting some 2,700 employees of the Manhattan Rubber Division of Raybestos-Manhattan, Inc., a six-cent pay raise was recently announced by the president of the Independent Manhattan Rubber Workers Union. He said the increase will bring starting pay to $1.72 an hour and the maximum, including incentive bonuses, to $2.94 an hour. The average production pay at the plant is between $2.35 and $2.40 an hour, he said.

Agreement to end the strike at three plants of Congoleum-Nairn, Inc., was reached on August 21 at a meeting of company representatives and international and local officers of the URW. Agreement was reached at a series of meetings held in New York. The strike, affecting 2,300 employees, began on June 13 at the Trenton, N. J., plant and on June 20 at the Kearny, N. J., and Wilmington, Del., plants.

Welch Named Research Director

L. M. Welch

Dr. L. Marshall Welch has been appointed director of research of the Petro-Tex Chemical Corp., with headquarters in the Houston, Tex., laboratories. Dr. Welch has been in charge of petrochemical research for the Central Research Laboratory of the Chemical Divisions, Food Machinery & Chemical Corp., and will continue to have responsibility for these activities. Prior to joining F.M.C., Dr. Welch was president of the Carter Bell Chemical Co., Springfield, N. J., and was previously associated for eight years with the Standard Oil Development Co., Linden, N. J., and E. I. du Pont de Nemours & Co., Inc. at Richmond, Va. He received his Ph.D. degree in chemistry at Purdue University in 1942. At the same time, Dr. Calvin N. Wolf, formerly with the Ethyl Corp. in Detroit and New York, has been named to succeed Dr. Welch on petrochemical research at the Central Research Laboratory now being completed at Princeton, N. J.

Textron Acquires Federal Leather

Textron, Inc., which has engaged in a major diversification program through the past few years, has disclosed the acquisition of the Federal Leather Co., Belleville, N. J. The purchase involves the exchange of 300,000 shares of Textron common stock with an approximate evaluation of $7,000,000. Textron now comprises thirteen companies whose products range from textiles to jet engine parts, plywood and generators. Federal Leather was established in 1919 as a tannery. This activity was discontinued in 1923 and the company has since concentrated on coated fabrics, vinyl film and foam. Federal Leather will be operated as a division of Textron with Louis M. Plansoen continuing as president and John Young as executive vice-president and secretary. No changes in policy, personnel or management are contemplated.

Take a long time for this copy of RUBBER AGE to reach your desk? Use the coupon on page 1065.

RUBBER INDUSTRY EMPLOYMENT SHOWN ACCORDING TO STATES

The Business and Defense Services Administration, U. S. Department of Commerce, notes that market analysts, endeavoring to measure sales potentialities in the rubber manufacturing industry, are usually interested in rubber consumption data by State areas. However, since multiple-plant companies report their consumption to BDSA in single consolidated returns which cover all their operations, consumption data by States or establishments are not available.

In this connection, some analysts find the substitution of employment data in the rubber manufacturing industry useful. The latest such data, by States, refers to employment in March, 1953. The publication *County Business Patterns,* published by the Bureau of the Census, reports total production workers in rubber manufacturing in the United States at 271,516 at that time, and provides employment information by States, as shown in the accompanying table.

According to this source, rubber manufacturing is carried on in 38 States, the District of Columbia, and Hawaii. Ohio accounts for 29.8% of the employment, Massachusetts 10.3%, California 6.1%, and Indiana, New Jersey, Pennsylvania, and Connecticut, over 5% each.

For States having a large production of tires and tread rubber, the rubber throughput per worker is of course greater than in States producing lines like footwear or drug sundries which require more labor per ton of rubber. Ohio, for example, accounts for a higher proportion of rubber consumption than is indicated by the proportion of employment, while, conversely, Massachusetts may account for a lower proportion.

UNITED STATES RUBBER MANUFACTURING EMPLOYMENT BY STATES

(as of March, 1953)

State	Prod. Workers	Percent of Total	State	Prod. Workers	Percent of Total
Ohio	80,930	29.81	Nebraska	1,045	0.39
Massachusetts	27,940	10.29	Mississippi	1,028	0.38
California	16,457	6.06	Missouri	857	0.32
Indiana	16,219	5.97	New Hampshire	837	0.31
New Jersey	15,151	5.58	Virginia	530	
Pennsylvania	14,929	5.50	Utah	379	
Connecticut	14,112	5.19	Georgia	268	
Michigan	12,956	4.77	Oregon	150	0.57
New York	9,312	3.43	Maine	138	
Illinois	8,612	3.17	South Carolina	44	
Rhode Island	7,638	2.81	Kentucky	39	
Maryland	6,882	2.54	Arizona		
Tennessee	5,921	2.18	Arkansas		
Colorado	5,311	1.96	District of Col.		
Alabama	5,181	1.91	Minnesota		
Wisconsin	4,628	1.70	Vermont	3,964*	1.46
Iowa	4,210	1.55	Washington		
Texas	2,138	0.79	West Virginia		
Oklahoma	1,362	0.50	Hawaii		
Delaware	1,176	0.43			
North Carolina	1,172	0.43	Total	271,516	100.00

*State totals withheld to prevent disclosure.

Offers to Buy Byers Stock

General Tire & Rubber Co., Akron, Ohio, has offered to acquire all the common and preferred stock of the A. M. Byers Co., Pittsburgh, Penna., through an exchange of stock. Negotiations first began early this year. Under the offer, the holders of Byers common stock would acquire one share of $5 cumulative preferred stock of General Tire for each three shares held. If less than 100,000 shares of Byers common is tendered, the exchange ratio will be three and one-half shares of Byers for each preferred share of General Tire. In either instance, the Byers holder will receive a warrant to purchase at $60 one share of General Tire for each three shares of the $5 preferred stock he receives. Holders of Byers preferred stock are offered for each share exchanged one and one-tenth share of General Tire preferred stock and a warrant to purchase one share of General Tire common stock at $70, or one share of General Tire preferred stock and $10 in cash. General Tire said it would accept all shares of Byers deposited by August 24, but it reserves the right to accept any or all of the shares deposited after that date to September 6, when the offer expires.

Have some comments to make? Write a letter to the editor! (See page 906).

Expanding Butadiene Plant

A multi-million dollar expansion program which will increase annual production of butadiene by 50% to 300,000 short tons in plant facilities in Port Neches, Texas, has been announced by W. I. Burt, president of Goodrich-Gulf Chemicals, Inc. The company is jointly owned by B. F. Goodrich Co. and the Gulf Oil Corp. In 1955, Goodrich-Gulf, together with the Texas-U.S. Chemical Co., purchased from the U. S. Government an undivided half interest in the Port Neches butadiene plant, having an annual capacity of 190,000 short tons. Goodrich-Gulf and Texas-U.S. are owners of two large synthetic rubber producing plants adjacent to the butadiene plant. The plants were purchased from the Government in May, 1955 and are served by pipeline from the nearby butadiene facility. Work on the expansion has already begun and some of the increased production will be realized late in 1957 and full production from the new facilities is scheduled for Fall of 1958. The butadiene plant is operated by the Neches Butane Products Co.

Consolidates Service Groups

National Adhesives Division of National Starch Products, Inc., New York, N. Y., has announced the consolidation of its service and development groups to effect better coordination between laboratory and technical service work. To effectuate this arrangement, Ralph C. McGaffin will be responsible for both the Adhesives Technical Service Department and the Adhesives Development Department. Mr. McGaffin has been with the company for the past 23 years. William W. Sederland, with technical service for the past 16 years, will be in charge of the Adhesives Development Department, and Samuel Gold will be in charge of adhesive technical service at National's Alexander Research Laboratory, Plainfield, N. J.

Board Ousts O'Sullivan Head

Vincent A. Catozella, president and chairman of the board of the O'Sullivan Rubber Co., Winchester, Va., was ousted by a split vote of the board of directors on August 15. J. C. Herbert Bryant has been elected chairman. A new president was not immediately named. Also removed by the board was H. D. Weaver, secretary and legal counsel. As yet, Mr. Weaver has not been replaced. Employees of the company have been on strike since May 13. However, a spokesman for the company said the removals had nothing to do with the walkout. He said the board meeting 'also approved and expressed confidence in the company's labor policies." Mr. Catozella himself said his removal was "a board maneuver made possible by some positions that caught me by surprise." He continues as a member of the board. Some 400 maintenance and production workers have been on strike in a dispute over a new contract. Since then, no progress toward settlement of the dispute has been reported. The company contends that production has been brought nearly back to normal by the return of strikers and the employment of "permanent" replacements.

R-B-H Resin 510 In Production

R-B-H Dispersions Division, Interchemical Corp., Bound Brook, N. J., has announced that "Resin 510" is again in production. The plant in Bauer, Utah, which produces this resin, was completely destroyed by fire last September. It has been rebuilt to twice its former capacity, with refinements and new safety features, and went into production recently. Resin 529, a new odor-and-taste-free version of Resin 510, is now being offered where these qualities are important. This will be the only pulverized form of the resin, and it will be refined by different methods and spray dried.

BRPRA REPORTS ON TECHNOLOGICAL ADVANCES MADE DURING 1955

A report covering its technical activities during 1955 has been issued by the British Rubber Producers' Association, Inc., which maintains headquarters at 19 Fenchurch Street, London, E.C.3, England. The technological efforts of BRPRA are divided between the evaluation and development of new products or processes emanating from the research teams and the application of more general technological improvements to advance the competitive position of natural rubber. An important aim of some work described in this report has to do with chemical modification of natural rubber. This work involves a detailed study of the chemical composition, structure and behavior of modified rubbers, the development of improved physical methods of assessing qualities such as tear and abrasion, and systematic technological evaluations.

One of the studies described in the current report is on the stability and processing behavior of the non-rubber constituents of latex, done in collaboration with the Rubber Research Institute of Malaya, who has supplied the freeze-dried latex fractions required as starting materials. Of the two major protein components of fresh latex serum, one (an albumin) is hydrolysed rapidly in alkaline solution and can have only a minor effect on the stability of ammoniated latex which is more than a few days' old. The other component (Hevea α-globulin) is very resistant to hydrolysis, and its electrical charge in ammonia solution increases slowly with time. Quantitative data concerning the electrical nature of Hevea α-globulin in acid and alkaline solution have been obtained, and the report states that it is probably significant from the standpoint of latex stability that a rapid increase in the charge on the protein occurs at pH greater than 9.5.

Further Studies Pursued

Further studies have been made of the lutoid or heavy fraction of fresh latex, which has been found to contain a high concentration of a strongly basic protein of a type generally found in rapidly growing plant or animal tissues. This finding, according to the report, is consistent with the view that the lutoids are to be associated with metabolic reactions in the tree. The protein, which has been partially purified, appears to occur as a labile complex with an acidic non-protein substance. The composition of this substance is also being examined.

In BRPRA studies, the general pattern of sulfur vulcanization emerged from structural and kinetic studies of the sulfuration of simple analogues of rubber. It has been deduced that sulfur combines by a process involving reactive ionic entities, and a detailed reaction mechanism advanced which logically explains the formation and nature of all the observed products—episulfides and polysulfides from mono-olefins, five- and six-membered cyclic sulfides and cross-linked polysulfides from 1:5—di-olefins (natural rubber is of this type).

The BRPRA has also studied the molecular breakdown which accompanies the oxidation of long chain polyisoprenes with highly purified gutta-percha. Measurements of the decrease in molecular weight as reaction proceeds permit the number of bonds broken to be related to the number of oxygen atoms absorbed. The report concluded from a detailed kinetic analysis that the degradation is a secondary reaction intimately associated with one of the propagation steps in the oxidation chain cycle, but more precise definition is proving elusive. Contrary to certain assertions, the report states, decomposition of hydroperoxide groups contained in the stable oxidation product is not primarily responsible.

Physical Deterioration Findings

In the physical studies of aging, it was found that the physical deterioration of vulcanizates reflects the net effect of concurrent bond-breaking and bond-forming processes. The extent to which these opposing structural changes contribute to the over-all effect varies with conditions, which is a major reason why different vulcanizates have different aging characteristics (e.g., of natural rubber and GR-S) and why observations under different conditions (e.g., everyday use, accelerated aging tests) cannot be directly correlated. Procedures for observing the two processes separately, and thus for determining their individual response to different conditions, are therefore being sought, the report declares.

As an addition to the established accelerated aging tests, the report states, a new method based on following the decay in tension of a rubber strip maintained at constant extension under controlled and defined conditions (stress relaxation) has recently been advocated. A detailed experimental and theoretical study of this method has now shown that the cross-linking reactions that occur to a comparable extent to scission reactions under the conditions used can be neglected. By combining simple stress relaxation data with those on intermittent stress relaxation and permanent set, the report notes, it is possible to follow the two processes separately. The BRPRA is extending this work to examine how the bond-forming and bond-breaking reactions are separately influenced by antioxidants.

Ozone Reactions Studied

The reaction of ozone with organic hydroperoxides has been further investigated by BRPRA and the products characterized. The experimental facts reported are consistent with an induced free-radical decomposition of the hydroperoxide, which in turn suggested that the ozonolytic cracking of rubber is a manifestation of an intense free-radical oxidation initiated by the attack of ozone on localized concentrations of rubber hydroperoxide. According to the report, this postulate, which requires that oxygen as well as ozone is a necessary reagent, has since been disproved by preparing oxygen-free ozone and demonstrating that rubber is cracked as readily by ozone under strictly anaerobic conditions as when oxygen is also present.

Work is proceeding on the determination of the relative rates of reaction of ozone with olefins containing differently constituted double bonds, and also with other reactive substances, in particular those functioning as "antiozidants." BRPRA preliminary results suggest that the latter may exert their protective action by competing with the rubber for ozone.

The degradation of rubber by ozone has been put to analytical use in a method whereby the attached polymer chains in certain polymer-modified rubbers can be quantitatively cut free from the rubber and their number and average molecular weight determined directly. The addition of a di-alkyl monosulfide, the report states, allows the ozone to destroy the rubber but effectively protects the synthetic polymer.

The chemistry of the softening of rubber by mastication in the cold is now well understood—the primary reaction is the mechanical shearing of the molecules into two very reactive free radicals. These radicals behave similarly to those generated in polymerization reactions in liquids, and their behavior toward inhibitors and chain transfer agents essentially determines the response of different rubbers to mastication under different conditions.

According to the report, this similarity would be expected to extend to rubber radicals acting as initiators toward polymerizable monomers, thus allowing the synthesis of block copolymers of rubber with synthetic polymers. A broad survey of such reactions has been made during the year by BRPRA.

Polymerization Interaction

The interaction of polymerizing vinyl monomers with rubber in latex or solution has received further intensive study. Last year's report referred to two anomalous features of these reactions: (1) the apparent attachment of abnormally short polymer chains to the rubber and (2) the specificity of the catalyst in inducing chemical combination. The first has been resolved. The report states that the fractionation procedure for separating the reaction product into rubber, free polymer, and rubber-polymer compound was inefficient for a special reason, and was responsible for false conclusions.

A revised procedure shows that the polymer chains attached to the rubber are, in fact, comparable in molecular size with those of the free polymer formed simultaneously, and this result has been confirmed by chemically degrading the rubber portion of the rubber-polymer compound (by two independent methods) and then characterizing the residual polymer. The reason for the second catalytic anomaly is still being sought, the experimental approach being to use catalysts containing radioactive carbon so that their modes of action can be traced and compared.

Although responsible for the fallacious characterization procedure mentioned above, the colloidal properties of rubber-polymer compounds are of potential usefulness. According to the report, these compounds can behave as either of the components separately or as a composite material, depending on the conditions of solution, coagulation and other environmental factors. It is possible, therefore, to prepare concentrated solutions of the interpolymers in mixed organic solvents. The report also observes that solid materials can be obtained from a single rubber-polymer compound with the properties of either component dominant.

In this report, further chemical, physical and technological aspects of the retardation of crystallization of natural rubber compounds maintained at sub-zero temperatures by the random addition of a small number of foreign groups to the rubber molecule are explored. The addition of thiol acids to rubber in latex has been studied, and efficient reaction conditions devised in the laboratory and adapted to pilot-plant scale operation.

The spectroscopy section has operated mainly as an analytical service, and more than 1,400 infrared and ultraviolet spectra were recorded for this purpose during 1955. A spectroscopic method for measuring the strengths of very weak acids and bases has been devised and applied to hydroperoxides and sulfoxides. Work is proceeding on the effect of sulfur atoms on the characteristic infrared absorption frequencies of neighboring methyl and methylene groups. The ultraviolet spectra of some recently isolated non-rubber constituents of latex are also being examined as an aid to their identification.

Study of Elastic Behavior

A detailed study of elastic behavior at both low and moderate extensions has enabled a clear differentiation to be made between the degree of vulcanization and the initial molecular weight of the rubber. The report claims that this work is proving of value in providing means for assessing the efficiencies of different vulcanization procedures with increased precision and in simplifying the changes in tensile quality in different vulcanizing systems.

In the last report, objective assessment of tear quality was made in terms of a tearing energy associated with the deformation of a small highly strained region at the tip of the growing tear. Experiments to test the validity and wider applicability of these ideas have been undertaken and have enabled the complex dependence of tear strength on temperature and rate of tearing to be interpreted rationally. The understanding of what determines the ultimate strength of rubber has been advanced with the recognition of a direct relationship between tear failure and tensile failure, the report states. This allows the work required for the latter to be deduced from tear measurements.

The report also points out that studies of cut growth during flexing or continuous cyclic deformation have indicated that the basic processes are the same as those operative in continuous tearing, and suggests that these various aspects of the rupture may be correlated within a single framework.

Earlier work has indicated that the complex process of abrasion can be described in terms of two simpler modes of particle removal from the rubber surface, each amenable to objective measurement in the laboratory. One, in which the particles are removed in such a manner as to produce a series of ridges and troughs, is termed "pattern abrasion"; the other, in which much finer particles are removed without producing any distinctive surface pattern, is referred to as "intrinsic abrasion."

The practical usefulness of these concepts has been examined by comparing these abrasive qualities in certain tread compounds with the respective English and American road wear data. It was found that the wear rating under American conditions correlated well with laboratory measurements of intrinsic abrasion—indicating that the service conditions causing pattern abrasion during wear are of minor importance. Wear rating in England, on the other hand, was found broadly to reflect the susceptibility to pattern abrasion which is accentuated by conditions prevailing on British roads and is conducive to greater tread wear. Depending on the particular conditions of road testing, a complete reversal of wear rating of different tread compounds may be obtained—behavior which can now be predicted from laboratory evaluation, the report declares.

In the technological studies done by BRPRA, attention has been given to the preparation and technical evaluation of methyl methacrylate-modified (M-G) latex of high solids content. Foam rubber cushions made from M-G latex of low methacrylate content have been in commercial production for more than a year, and experience amply confirms the suitability of such latex for large scale processing, the report claims. Improvements have also been effected in the processing and properties of foam sponge made from latex heat-sensitized with polypropylene glycol (Polyglycol HS 35/40).

In the technological studies done with antiozidants, *N,N'-dioctyl-p*-phenylenediamine (DOPD) was found effective for all types of natural rubber compound, and in adequate concentration its protective action is maintained against artificially high ozone concentrations and in samples under repeated deformation. A less favorable property of DOPD is its tendency to "stain."

Peroxide Vulcanization Studied

Further technological studies were done with peroxide vulcanization, using dicumylperoxide (DCP). Aging resistance was very good and was not appreciably impaired by overcuring, the report states. DCP-vulcanized rubbers excel in their elastic properties, the report claims, and such properties suggest the suitability of such vulcanizates for mechanical applications.

The use of rubber-polymethyl methacrylate graft polymers as reinforcing materials in flexible rubbery compounds has been outlined in earlier reports. Emphasis has recently shifted to developing a reinforcing resin of this type of maximum stiffening power consistent with good physical properties and processing behavior in products compounded with additional dry rubber. Hevaplus M-G50 is outstanding in this respect, the report claims.

Rubber-lignin masterbatches can be compounded with additional cheap fillers with minimal loss in properties, and semi-rigid products can be obtained that are easier to process than those with high loadings of mineral fillers alone. But, the report continues, it is doubtful whether their properties are sufficiently unique to outweigh the convenience each manufacturer finds in using mineral and resin fillers, alone or in combination, according to his specific requirements.

Combining Latices Beneficial

Another BRPRA finding is that coagulation and processing into crepe, smoked sheet or air-dried sheet of a mixture of four parts of field latex and one part of vulcanized latex gives a rubber with sheeting and extrusion properties markedly superior to those of ordinary grades. The Association is currently undertaking a comprehensive examination of skim rubber from various sources and of modified skim rubber in which the protein content has been substantially reduced by enzymatic and other treatments.

In engineering applications of rubber, BRPRA-designed rubber pads for railway track mounting continues on an increasing scale. Work has also been done on supports for a road bridge, steel roller covering cushions to protect the heads of

Atomic Vulcanizing Process

An ultra-fast method of using atomic "bullets" to vulcanize silicone rubber has been devised by three scientists of the Westinghouse Electric Corp. The process beams two-million volt electrons at a silcone gum and almost immediately converts it into silicone rubber. Its discoverers say that the technique produces a better rubber in two seconds than conventional vulcanizing methods yield in several hours. Company spokesmen state that while the process is not yet ready for commercial application, irradiation with high-energy electrons will eventually become an important method of vulcanizing silicones industrially. The process is said to duplicate all the good features of chemical vulcanization without introducing chemical agents which remain in the rubber and spoil some of its desirable properties—especially those required for electrical insulation. Another advantage of the new technique is the ease and precision with which it can be controlled.

concrete piles, and supports for 40-inch concrete sewer pipes. Eight full-scale road experiments have been completed during the past year for the purpose of examining the use of various forms of rubber with conventional road-building materials.

Reports on RTD Developments

The activities of Rubber Technical Developments, Ltd., include the development of latex foam articles from heat-sensitized latex. In particular, the use of latex containing polyglycol HS 35/40 has been examined in several applications. The report notes that apart from over-all simplicity, the high stability of the foam at room temperature is a particular advantage for batch production involving a large number of mold units. This group is also continuing its work with rubber-bonded non-woven fabrics, which now can be produced by continuous operation.

RTD has issued a broadsheet giving technical information on the use of cyclized rubber in resin-rubber soling compositions. The masterbatch compares favorably as a filler with non-black particulate fillers and is broadly equivalent to synthetic rubber-resin reinforcing materials in conferring on the final product hardness and stiffness, with reasonable strength and low density, the report states.

In its work with Heveaplus M-G50, RTD has concentrated on (1) the regular production of the raw material on pilot-plant scale, and (2) the formulation, and then supply to industrial users, of compounded stock giving the desired final product as economically as possible under specified processing conditions.

The value of latex-bitumen emulsions in soil stabilization has been investigated in model experiments. These indicate that increased crushing loads and improved recovery on deformation can be obtained, although the proportion of latex required for worthwhile improvement is rather high. The relative efficiency of different types of emulsions is now being determined.

Drogin Addresses IRI Sections

Dr. I. Drogin, vice-president in charge of research for the United Carbon Co., Inc., Charleston, West Virginia, recently addressed the Melbourne and Sydney, Australia, sections of the Institution of the Rubber Industry. In both cases, Dr. Drogin discussed the effects of mixing time on the properties imparted to rubber by the reinforcing types of carbon blacks, which was the subject of the paper he delivered at the Cleveland meeting of the ACS Division of Rubber Chemistry last spring. This paper described the effects when the first stage mix or masterbatch is Banbury mixed for as short a time as 1½ minutes and as long as 12 minutes, as well as the effects of working the masterbatch on the sheet-off mill as long as 8 minutes immediately after its discharge from the Banbury. According to reports from Australia, both talks were well received and were followed by extensive question-and-answer periods. Dr. Drogin is currently on a world-wide tour of rubber factories and laboratories and is not expected to return until late this fall. He is accompanied by Mrs. Drogin.

Purchasing Graton & Knight

Aetna Industrial Corp., New York, N. Y., which owns and operates a number of diversified companies, has agreed to purchase the major assets of Graton & Knight Co. of Worcester, Mass. The purchase price was not announced. The cash transaction has been approved by Graton & Knight directors and was submitted to and approved by stockholders on August 30. Under terms of the agreement, Aetna gets control of the Worcester plant, Graton & Knight, Ltd. of London, England; I. B. Williams & Sons of Dover, N. H.; Dixie Leather Corp. of Albany, Ga.; and Dickey Belting Co. of Lewiston, Me., all affiliates of Graton & Knight. International Packing Corp. of Bristol, N. H., was not included in the transaction.

Nylon Cord Aircraft Tires

According to the Firestone Tire & Rubber Co., Akron, Ohio, owners of light aircraft now may equip their planes with tires of nylon cord construction at the same price previously paid for rayon. Firestone has announced a new nylon tire in all sizes for light aircraft. The new line replaces tires of rayon construction at no increase in price for the same size and ply rating. Two sizes of the new Firestone nylon tire, 7.00-6 with 4-ply rating and 11.00-12 with 8-ply rating are available now. Eight additional sizes and styles, to equip every type of light aircraft, soon will be on the market.

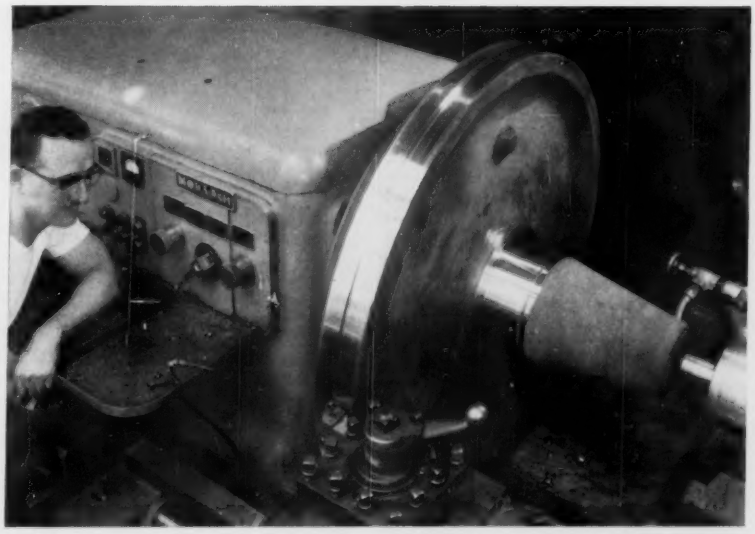
Neoprene Comparison Chart

The Elastomers Division of E. I. du Pont de Nemours & Co., Inc., comments that product designers and maintenance engineers often ask rubber manufacturers for a comparison of the different kinds of rubber. How, they want to know, do natural rubber, nitrile, Butyl and neoprene compare in tensile strength, resilience, permanent set, oil resistance and so on. Four rubber goods manufacturers have answered the questions by publishing comparison tables in their catalogs. For each property they give each kind of rubber a rating—excellent, good, fair or poor. Based upon these four tables, DuPont compiled a chart, which is now available. This chart indicates, the company states, that neoprene is the most versatile of the rubbers. Copies of this interesting chart may be had by writing the company.

Expanding Fatty Acid Unit

The Chemical Division of the HumKo Co., Memphis, Tenn., has announced two significant modifications in equipment now being installed for fatty acid distillation. The new unit will supplement a continuous still installed in 1944 and includes a radiant heating furnace and a stainless steel vessel. This is said to be the first time that a radiant heating furnace will be used in this industry. The use of this type of furnace, the company explains, makes the stainless steel vessel practical and highly advantageous. Construction of the new facility is expected to be completed early in 1957.

PREPARATION OF 44-INCH STEEL FORGING FOR TIRE VULCANIZING PRESS



Looking like a drive wheel for a railroad locomotive, but actually a huge crank gear blank for a tire vulcanizing press, the 44-inch diameter steel forging shown above is one of a series currently being precision machined in the plant of the McNeil Machine & Engineering Co., Akron, Ohio. Formerly a job which because of workpiece size and weight could be handled only on a vertical mill, complete rough and finish turning are being done to greater advantage today on a new Monarch series 90 heavy-duty dyna-shift lathe with 48-inch swing. The small diameter is also rolled for smoothness and hardness on this machine. Using both carbide and high-speed steel cutting tools, accuracy is held within .001 inch. Roughing cuts up to 5/8 inch in depth are routine; give an indication of the ruggedness of the machining operations regularly being performed, McNeil Machine states.

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(Easy Processing Channel)

STATEX-B FF
(Fine Furnace)

STATEX-M FEF
(Fast Extruding Furnace)

STATEX-93 HMF
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FURNEX® SRF
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NRDB PLANS LONDON MEETING ON RUBBER IN ENGINEERING

The Natural Rubber Development Board, London, England, notes that during the last few years engineers throughout the world have been making increasing use of rubber as an engineering material. Many new developments have arisen as a result of this interest. To assist in making recent developments more widely known, NRDB, which is a non-trading organization sponsored by natural rubber producing interests for the purpose of promoting and encouraging the use of their commodity, is organizing a one-day conference on "Rubber in Engineering."

The conference will be held on September 27, 1956, in the Lecture Hall of the Institution of Electrical Engineers, Savoy Place, London W.C. 2, England. The following program has been established:

10:00 A.M.—Official opening.

10:15 A.M.—"Recent Advances in the Engineering Use of Rubber" by W. J. S. Naunton.

11:00 A.M.—Load-Deflection Relations and Surface Strain Distributions for Flat Rubber Pads" by A. N. Gent.

12:15 P.M.—Film: "Rubber in Engineering".

12:45 P.M.—Luncheon.

2:15 P.M.—"The Use of Rubber in Heavy Engineering" by S. W. Marsh.

3:30 P.M.—"Dynamic Fatigue Life of Rubber Components" by P. W. Turner.

4:15 P.M.—"Rubber in Agricultural Engineering" by S. J. Wright.

Light refreshments will be provided for visitors at 11:45 A.M. and at 3:00 P.M. It should be noted that the times of the presentation of the various papers are subject to revision. In order to assist those who wish to be present for certain papers only, actual times will be available when preprints of the papers are circulated.

The film referred to in the program will be shown for the first time at this meeting, and a display of engineering uses of rubber will be staged by leading manufacturers in this field. Those desiring to attend the conference should so advise the Conference Secretary, Natural Rubber Development Board, Market Buildings, Mark Lane, London E.C. 3, England.

Mechanical Goods Symposium

The Fall Meeting of the New York Rubber group, which will be held on October 5 at the Henry Hudson Hotel in New York, N. Y., will feature a "Symposium on Mechanical Rubber Goods." M. E. Lerner, editor of RUBBER AGE and secretary of the group, will serve as moderator. The symposium will cover the latest developments in belting, hose, small molded goods and cellular rubber goods, compounding and equipment. The meeting will include short talks by six panelists and an extensive question-and-answer period. The panelists and their subjects are: *Belting*, W. L. White (Manhattan Rubber); *Hose*, J. L. Muller (Thermoid Rubber); *Small Molded Goods*, L. Cranston (U. S. Rubber); *Cellular Rubber Goods*, George Sprague (Goodrich Sponge); *Compounding*, F. L. Amon (Godfrey L. Cabot), and *Equipment*, E. Herbert Johnson (Farrel-Birmingham).

Coming Events in the Rubber Industry

Sept. 15. No. California Rubber Group, Summer Outing, Turtle Rock Ranch, Mt. Diablo, Calif.

Sept. 18-21. Division of Rubber Chemistry, A.C.S., Chalfonte-Haddon Hall, Atlantic City, N. J.

Sept. 27. Fort Wayne Rubber & Plastics Group, Hotel Van Orman, Fort Wayne, Ind.

Sept. 28. Chicago Rubber Group, Furniture Mart, Chicago, Ill.

Oct. 2. Buffalo Rubber Group, Fall Meeting.

Oct. 2. Los Angeles Rubber Group, Statler Hotel, Los Angeles, Calif.

Oct. 5. Boston Rubber Group, Fall Meeting, Hotel Somerset, Boston, Mass.

Oct. 5. Detroit Rubber & Plastics Group, Fall Meeting, Detroit-Leland Hotel, Detroit, Mich.

Oct. 5. New York Rubber Group, Henry Hudson Hotel, New York, N. Y.

Oct. 11. No. California Rubber Group.

Oct. 11-12. Society of the Plastics Industry, New England Section Conference, Wentworth Hotel, Portsmouth, N. H.

Oct. 25. So. Ohio Rubber Group.

Oct. 26. Akron Rubber Group, Mayflower Hotel, Akron, Ohio.

Oct. 26. Philadelphia Rubber Group, Poor Richard Club, Philadelphia, Penna.

Nov. 2. Chicago Rubber Group, Furniture Mart, Chicago, Ill.

Nov. 8. No. California Rubber Group.

Nov. 8. Rhode Island Rubber Club, Fall Meeting, Pawtucket Country Club, Pawtucket, R. I.

Nov. 14. No. California Rubber Group.

Nov. 16. Connecticut Rubber Group.

Dec. 4-5. Society of the Plastics Industry, Seventh Film, Sheeting and Coated Fabrics Division Conference, Commodore Hotel, New York, N. Y.

Dec. 5. Buffalo Rubber Group, Xmas Party.

Dec. 6. Fort Wayne Rubber & Plastics Group, Hotel Van Orman, Fort Wayne, Ind.

Dec. 7. Detroit Rubber & Plastics Group, Xmas Party, Sheraton-Cadillac Hotel, Detroit, Mich.

Dec. 7. No. California Rubber Group, Xmas Party, Orinda Country Club.

Dec. 14. Boston Rubber Group, Xmas Party, Hotel Somerset, Boston, Mass.

Dec. 14. New York Rubber Group, Xmas Party, Henry Hudson Hotel, New York, N. Y.

Dec. 15. So. Ohio Rubber Group.

Dec. 21. Chicago Rubber Group, Xmas Party, Morrison Hotel, Chicago, Ill.

Jan. 25, 1957. Akron Rubber Group, Mayflower Hotel, Akron, Ohio.

Jan. 25, 1957. Philadelphia Rubber Group, Poor Richard Club, Philadelphia, Penna.

Feb. 15, 1957. Chicago Rubber Group, Furniture Mart, Chicago, Ill.

Mar. 15, 1957. Chicago Rubber Group, Furniture Mart, Chicago, Ill.

Apr. 26, 1957. Chicago Rubber Group, Furniture Mart, Chicago, Ill.

May 15-17, 1957. Division of Rubber Chemistry, A.C.S., Joint Meeting with Rubber Chemistry Division of C.I.C., Sheraton-Mount Royal Hotel, Montreal, Que., Canada.

Sept. 11-13, 1957. Division of Rubber Chemistry, A.C.S., Fall Meeting, Hotel Commodore, New York, N. Y.

May 14-16, 1958. Division of Rubber Chemistry, A.C.S., Spring Meeting, Netherlands Plaza Hotel, Cincinnati, Ohio.

Pelmor Laboratories Opens

Coleman P. Morgan

Coleman P. Morgan, active in the rubber and plastic fields for 44 years and former chairman of the Hard Rubber Section, ASTM Committee D-11, has announced the opening of Pelmor Laboratories, Inc., 401 Lafayette Street, Newtown, Penna. The new laboratory is equipped to handle specialized problems relating to hard and soft rubber and plastics. Formulation, processing, molding, instrumentation, methods, equipment, specifications, control, testing, molds and mold design are some phases of hard rubber research and development the laboratory is equipped to undertake. The laboratory can also handle specialty formulation and specification problems involving synthetic rubbers of all types. Molding methods and procedures, compression and transfer molding methods are another speciality. Testing equipment includes the following for: oxygen bomb aging, Greer oven aging, general physical testing tensile, elongation, hardness, etc., compression testing and compression set analysis, particle size analysis, low temperature testing, impact testing, oil immersion testing, softening point determination, abrasion resistance, electrical testing, including dielectric, arc resistance, power factor, resistivity, and chemical analysis.

Catalin Antioxidant AC-1

Catalin Corp. of America, New York, N. Y., has announced a new product, "Antioxidant AC-1" (2, 6-ditertiary-butyl-para-cresol) which is said to be useful in preventing oxidation in hydrocarbons such as rubber, polyethylene, waxes, drying oils, etc. AC-1 is effective in concentrations of less than .005 to 2.0% by weight for the majority of applications, the company states. The pure compound has a molecular weight of 220.34 and a specific gravity of 0.899 at 80/4°C. It has a freezing point of 70°C. and a boiling point of 265°C. at 760 mm. In crystal form, and white in color, the product has a mild odor and a screen analysis of 90% on 40 mesh and 10% on 70 mesh. Antioxidant AC-1 is essentially non-toxic under normal handling conditions. It is stable over long periods of storage in the containers in which it is shipped. Where rubber is concerned, Antioxidant AC-1 is non-discoloring and non-staining. It is useful in white sidewall tires because of its non-discoloring property and in rubber used for gasketing or other applications where the rubber will contact light enamels or lacquers. AC-1 can be prepared in emulsion form to protect water dispersible rubber or rubberlike latices. Pressure sensitive tapes, wiring insulation and light colored rubber stock in general will be protected by AC-1, the company states. Vinyl films are also protected by the addition of the product.

Report of NRL Progress

Report of NRL Progress, published monthly by the Naval Research Laboratory, can now be obtained on a subscription basis from the Office of Technical Services, U. S. Department of Commerce. This new source of research information in many scientific and industrial fields was first made available to the public with the January, 1956, issue, but has been distributed by OTS on an individual issue purchase basis only. Annual subscription rates are $10.00 domestic, $13.00 foreign. Single issue price is $1.25. Orders should be addressed to OTS, U. S. Department of Commerce, Washington 25, D. C.

Seen here is a view of the new Pelmor Laboratories at Newtown, Penna.

Miller Named Vice-President

B. Harding Miller

George Woloch, president of George Woloch Co., Inc., New York, N. Y., has announced the appointment of B. Harding Miller as vice-president. Mr. Miller has been in the rubber and plastics business since 1938, and has been manager of the company's branch office in Akron, Ohio, since 1951. Mr. Miller served in the U. S. Army Air Corps from 1942 to 1945.

Ivory Coast Rubber Institute

According to reports from Paris, a rubber research institute has been created on the French Ivory Coast to study the possibilities of introducing hevea plantings in that part of Africa. Known as the Ivory Coast Rubber Research Institute, the organization was formed by the Executive Committee of Fides, a French investment fund for the equipment and modernization of overseas territories. This organization, working under the Overseas Ministry, has to do with equipment and modernization programs for French overseas territories. The new rubber research institute will establish on the Ivory Coast an experimental station which will study production possibilities of varieties specially selected in the Far East or in already existing hevea plantings. This experimental station will be built near Abidjan.

Adds to Institute Plant

Announcement that the Girdler Co., Louisville, Ky., has been awarded a construction contract for a boiler house at the synthetic rubber plant of Goodrich-Gulf Chemicals, Inc., Institute, West Virginia, has been made by W. I. Burt, Goodrich-Gulf president. The company is owned jointly by Goodrich and the Gulf Oil Corp. The new power plant, to cost $1,500,000, is designed to generate 100,000 pounds of steam per hour in two boilers. Space will be provided for a third 50,000 pound capacity boiler should additional steam be required for later operations of the 122,000 ton rubber-producing plant. Goodrich-Gulf Chemicals, Inc., purchased the Institute plant from the government early this year for $11,000,000.

AKRON POLYMER LECTURE GROUP ANNOUNCES 1956-57 PROGRAM

The Akron Polymer Lecture Group has announced a series of eight lectures for the season beginning on October 5, 1956. All lectures will be held at the University of Akron, Akron, Ohio. N. V. Seeger (Goodyear) is chairman of the group with M. E. Dannis as vice-chairman. R. A. Briggs (General Tire) is chairman of the Program Committee and J. R. Miller is serving as treasurer. R. Leshin (Goodyear) is secretary of the group. Inquiries regarding the lecture series should be addressed to: Dr. R. A. Briggs, Program Chairman, Research Laboratory, General Tire & Rubber Co., Akron 9, Ohio. The following lecturers will speak on the dates noted:

October 5—"Crystallization in High Polymers" by Dr. Leo Mandelkern (Bureau of Standards).

November 2—"Polymerization of Cyclic Oxides" by Professor C. C. Price (University of Pennsylvania).

December 7—"Catalyst Systems for the Production of Crystalline Polyethylenes" by Dr. Edmund Field (Standard Oil—Indiana).

January 4—"Some Mechanical Properties of Heterogeneous Polymeric Systems" by Dr. Rolf Buchdahl (Monsanto).

February 1—"Recent Developments in Fibers" by Dr. J. H. Dillon (Textile Research Institute).

March 1—"Radiation Produced Graft Polymers" by Dr. D. S. Ballantine (Brookhaven National Laboratory).

April 5—"Some Studies on the Oxidation of Elastomers and Their Compositions" by Professor J. R. Shelton (Case Institute).

May 3—"Boron Polymers" by Dr. W. L. Ruigh (Wright Air Development Center).

RM-64 Protective Coating

Rubber Magic, Inc., of Brooklyn, N. Y., has introduced a new protective coating "RM-64," an alloy of plastic and synthetic rubber in latex form. Non-inflammable in the liquid state, this new product can be brushed on, sprayed on, or dipped. The Brooklyn firm states that internal testing and climatic exposure reveals RM-64 resists strong acids, salts, mild alkalies, alcohol, and a wide variety of corrosives. Of even greater value to the industrial field is the fact that RM-64 can be used as a corrosion-proof and acid-resistant coating for steel, metal, wood, or masonry tanks and vessels containing acids and salt solutions. The product adheres to a wide variety of surfaces. The free film has good cut, high impact resistance, and is also non-toxic. Moreover, the film cures catalytically with excellent flexibility and tensile strength (elongation: 225%; tensile dry film: 2500 pounds per square inch). It can be air-dried or given a short 15-minute bake at 250°F. This new coating comes in all colors and transparent.

Have some comments to make? Write a letter to the editor! (See page 906).

MINNESOTA RUBBER AND GASKET FORMS NEW WHOLLY OWNED SUBSIDIARY

Minnesota Rainbow Rubber Co., Minneapolis, Minn., a new firm producing custom-molded rubber parts from a variety of colored materials, began operations on July 1 as the third wholly owned subsidiary of the Minnesota Rubber & Gasket Co. President of the Rainbow concern is Robert W. Carlson, who is also vice-president and treasurer of the parent organization.

A modern one-story brick building has been acquired and furnished with production supplies, machines and office equipment. Richard Mueller, who has been active in rubber production and management at the parent firm for 15 years, is in charge of Rainbow plant operations. The building has been located and designed to prevent possible contamination from the black carbon used in normal rubber processing. Separation of this kind, Mr. Carlson said, will provide the customers with color consistency from the start to the end of each production run. It was reported that both natural and synthetic rubber materials are available with strict control on compounding and ingredients.

Minnesota Rainbow Rubber will be represented on a national basis with regional sales offices in New York, Philadelphia, Chicago, Cleveland, Detroit, Milwaukee, St. Louis, Denver, Houston, Los Angeles, and Portland, Ore. The new main plant is located on Highway 7 in the Minneapolis suburb of St. Louis Park.

H. O. Canfield Passes Milestone

H. O. Canfield Co. of Bridgeport, Conn., founded in 1888 and in continuous operation from that date at Bridgeport—with subsidiaries at Clifton Forge, Va., and Seymour, Ind.—has announced the passing of a milestone that is as significant as their 68th anniversary in the manufacture of rubber products. On August 6, 1956, Canfield ordered from its tool maker Mold No. 15,000. This is an outstanding occasion as it joins a long list of molds and tools that have been manufactured for the aeronautical, automotive, electrical, home appliance, plumbing and general industry. The original molds, some of which are still in existence, were manufactured from cast iron in comparison to the current molds which are made from high grade tool steel and machined to high precision tolerances.

New Harshaw English Subsidiary

Harshaw Chemical Co., of Cleveland, Ohio, has established a wholly-owned English subsidiary, Harshaw Chemicals, Ltd., with offices, manufacturing plant and laboratories at Waltham Cross, London, England. The new unit was formed primarily to supply electroplating chemicals and processes for the British Isles. Other chemicals manufactured by the parent company are expected to be added as markets are developed. A. C. Benning, long active in the manufacture, sale and service of electroplating chemicals at the home office, is manager of the new unit. S. E. Pross, Hounslow, has been made assistant general manager.

Goodrich Research Personnel

B. F. Goodrich Co., Akron, Ohio, has announced the appointment of six new members to the Research Center at Brecksville, Ohio. John F. Anderson, with the B. F. Goodrich Co. since 1928, has been appointed a research chemist in adhesives. Norman E. Ernstein, who previously worked for the Ohio State University Research Foundation and the National Advisory Committee for Aeronautics, has joined the Research Center staff as a chemical engineer in the high pressure laboratory. Four new technical workers at the Center include: Kenneth F. Gill, formerly with Kewaunee Manufacturing Co., National Aniline Division of Allied Chemical and Dye Corp., and Industrial Rayon, in chemistry research; Margot Kincaid Myers, previously with the Carnegie Institute of Washington, the Columbia-Southern Chemical Co. and the University of Akron government laboratories; Richard H. Backderf, who recently received his Ph.D. degree from Ohio State University, and Charles Schaef, who formerly taught at the Case Institute of Technology.

Hubbard Announces Retirement

Retirement of Cecil R. Hubbard, vice-president in charge of production of the Garlock Packing Co., Palmyra, N.Y., has been announced by the company. Mr. Hubbard has been with Garlock thirty-three years. Appointment of a successor has not been announced. The company manufactures mechanical packings for water and oil pumps and other mechanical devices. Mr. Hubbard holds forty patents and has designed many changes in packings.

Names in the News

RILEY P. MCGLOTHLIN, formerly with the Office Management Department of the Monsanto Chemical Co., has joined the Mobay Chemical Co., St. Louis, Mo., as personnel supervisor for the administrative offices.

K. W. MCCONKY, New York account executive; R. E. ALLEN, operating manager; C. A. BETHEL, account executive, and E. J. STEGGEMAN, account executive, have been honored by the Goodyear Tire & Rubber Co., Akron, Ohio, for continuous service totaling 90 years.

DR. U. T. GREENE of the Diamond Alkali Co., Cleveland, Ohio, has been appointed director of the Chemical and Rubber Division, Business and Defense Administration, U. S. Department of Commerce.

FRANK C. MCWILLIAMS, formerly media manager in the Advertising Department of the Firestone Tire & Rubber Co., Akron, Ohio, has been named administrative assistant to Charles B. Ryan, general advertising and merchandising manager. G. EARL MOORE will succeed Mr. McWilliams as media manager.

MACLEAN BROWN has been appointed operations manager in charge of production and supervision of the Spare Parts Department of the Hull-Standard Corp., Abington, Penna.

RALPH W. SOHL, chief engineer for the Agricultural Tire Development Department of the Goodyear Tire & Rubber Co., has retired after a 37-year association with the company.

GEORGE S. KETTER, formerly manager of industrial engineering of the Goodrich Tire Co., has been named manager of engineering design for the B. F. Goodrich Co.

ROBERT MORAN, formerly manager of the Air Springs Division, General Tire & Rubber Co., Akron, has been promoted to manager of defense and new products sales.

ARTHUR W. DOBBERSTEIN, vice-president-manufacturing for the International Latex Corp., Dover, Dela., has been named to the newly created post of vice-president-international manufacturing. H. GORDON FROMM, works manager, succeeds Mr. Dobberstein as vice-president-manufacturing.

COLIN M. FORD, JR., has been advanced to assistant manager of the Seiberling Rubber Export Co., Akron, Ohio. Mr. Ford has been employed by the export company since February, 1955.

JOHN L. CASSULLO, treasurer of Fritzsche Brothers, Inc., New York, N. Y., has been elected to the presidency of the 85 year old essential oil and aromatic chemical firm by the board of directors.

BOYD C. EBERHARD, chief engineer in charge of tubes and accessories at the Goodyear Tire & Rubber Co., Akron, Ohio, who played a direct role in the development of the Captive-Air safety tire, has retired after 46 years service.

L. L. BALDWIN of the Firestone Tire & Rubber Co., Akron, has been elected vice-chairman representing the Akron-Canton District of the Cleveland Section of the Society of Automotive Engineers.

G. FRED HOGG, assistant general manager since 1954, has been advanced to general manager of the Naval Stores Department of the Hercules Powder Co., Wilmington, Del.

RICHARD D. MITCHELL has been appointed plant engineer at the Fremont, Ohio, plant of Hewitt-Robins, Inc.

GEORGE B. MORAN, previously vice-president of the Hanover Bank, has joined the Freeport Sulphur Co., New York, N. Y., as vice-president in charge of domestic and foreign sales.

DIXON C. VAN WINKLE has been appointed by the Atlas Powder Co., Wilmington, Del., to the newly created post of field sales manager for the Chemicals Division.

GEORGE DEURELL, JR., formerly manager of merchandise control at the Windsor, Vt., plant of the Goodyear Tire & Rubber Co., has been named operating manager of the Shoe Products Division at Windsor.

JOHN R. SWANN, secretary-treasurer, Dunlop Canada Ltd., Toronto, has been elected to membership in the Controllers Institute of America.

DANIEL L. PELLETT, formerly manager of the Engineering Design Department, B. F. Goodrich Co., Akron, Ohio, has been appointed to the newly created position of director of Engineering Services.

RICHARD A. STEENROD, formerly with the General Engineering Laboratory of the General Electric Co., has been appointed a materials engineer for the Silicone Products Department.

A. E. ROSENBERGER has been advanced to night shift superintendent of the Seiberling Rubber Co., Barberton, Ohio; JOHN HORVATH has been named general foreman of the newly combined Milling and Calendering Division, and JACK MCBRIDE has been made Milling Department foreman.

ERNEST P. BRUNSWICK, third ranking employe in length of service at the Goodyear Tire & Rubber Co., Akron, has retired after a 53-year association with the company.

CARL G. GUERIN, until recently associated with Linear, Inc., as factory manager, has joined the production staff of the Johns-Manville Co., at Manville, N. J.

PAUL BEEBE, SR., previously production manager for Nippon Goodyear KK, Kurume, Japan, has been placed in charge of foreign operations compounding for the Goodyear Tire & Rubber Co., Akron.

J. W. LOUGHRIDGE, formerly with the Rust Master Chemical Corp., has been added to the sales force of the W. F. Voit Rubber Corp., Los Angeles, Calif.

RICHARD C. TEN EYCK, formerly field representative at Minneapolis, Minn., for the Goodyear Tire & Rubber Co., Akron, has been promoted to manager of the Tank Lining and Industrial Rubber Covered Roll Sales Department.

THERON J. THADEN has been named chief engineer, agricultural tire development, for the Goodyear Tire & Rubber Co., Akron, Ohio. He succeeds R. W. SOHL, who retired recently following 37 years with the company.

MERRITT W. WOLFE has been appointed chief engineer in charge of tube and accessory design for the Goodyear Tire & Rubber Co., Akron.

EARL F. HARRIS, executive vice-president of the Rodney Hunt Machine Co., Orange, Mass., has been elected president.

DR. N. V. SEEGER, section head on polyurethane polymers at the Goodyear Tire & Rubber Co. research laboratories, has been named chairman of the Akron Section of the American Chemical Society for 1956-57.

KYLE W. CHARLTON, with the Mobay Chemical Co., St. Louis, Mo., since January, 1956, as a senior chemical engineer in the Technical Services Department, has been promoted to operating supervisor of the Polyester Department.

EDWARD J. FREDERICKS, formerly sales manager of the Bessemer-Stanton Co., has been named assistant sales manager of the Automotive Division, Wooster Rubber Co., Wooster, Ohio.

CHESTER T. MORLEDGE, previously general manager, merchandising, of the B. F. Goodrich Tire Co., has been appointed general manager, special brand sales.

W. D. SHILTS, who joined the Goodyear Tire & Rubber Co. in 1905 in its sales organization and who for 27 years served as its secretary, has retired after 51 years of continuous service with the company.

DR. DANIEL T. SIGLEY, formerly chairman of the Guided Missile Steering Committee and associate director of the General Engineering Laboratories for the American Machine & Foundry Co., has been appointed chief engineer of the Guided Missile Division, Firestone Tire & Rubber Co. of California.

EDWARD S. COE, JR., vice-president and a director of Farrel-Birmingham, Inc., has been appointed general manager of the company's Consolidated Machine Tool Division, Rochester, N.Y.

JAMES B. WILKIE, associated with the Pratt & Whitney Co. since 1935, has been named manager of the Gage Division.

C. F. SMITH, chief project engineer for the Belting Sales Department of the Goodyear Tire & Rubber Co., has been awarded a lapel pin marking 35 years of continuous service with the company.

JOHN C. VIRDEN, chairman of the board of the Federal Reserve Bank of Cleveland and board chairman of the John C. Virden Co., has been elected a director of the Goodyear Tire & Rubber Co.

JAMES LOWE, associated with the Orange, Calif., plant of the Anaconda Wire & Cable Co. for several years, has been promoted to technical director succeeding JOHN TIDGEWELL who has been named assistant plant superintendent.

DR. GEORGE H. HICKOX, formerly program director for engineering sciences with the National Science Foundation, has been named director of research at the Army Corps of Engineers Research and Development Laboratories, Fort Belvoir, Va.

DR. ROBERT B. MESROBIAN, formerly associate director of the Polymer Research Institute of the Polytechnic Institute of Brooklyn, has been named associate director of research, high polymer chemistry, for the newly created Central Research and Engineering Division of the Continental Can Co.

GROVER C. SHUMAN, formerly manager of warehousing and shipping at the Akron tire plant of the B. F. Goodrich Tire Co., has been named staff superintendent of the plant. WILLARD S. CLEPPER succeeds Mr. Shuman as manager of warehousing and shipping at the plant.

J. W. KEENER, executive vice-president of the B. F. Goodrich Co., has been presented with the Department of the Army's highest civilian award for his contributions to a committee composed of six industrial relations executives which advised the Army on its world-wide civilian management program.

ROBERT J. STURWOLD and E. B. COOK, JR., have joined the research staff of Emery Industries, Inc. Mr. Sturwold has joined the Organic Research Section and Mr. Cook has joined the Process Research Section.

S. H. WILLIAMS, vice-president of the General Aniline & Film Corp., has been promoted from general sales manager to assistant general manager of the Dyestuff and Chemical Division.

HAROLD W. BURKETT, treasurer of the U. S. Rubber Reclaiming Co., has been elected secretary of the Buffalo Control of the Controllers Institute of America.

Heads Thiokol Butyl Sales

John T. Dunn

Thiokol Chemical Corp., Trenton, N. J., has announced the appointment of John T. Dunn to head its new Butyl Sales-Service Organization. Mr. Dunn comes to Thiokol from Montreal with twenty years of experience in the rubber industry. He holds a degree in chemical engineering from the University of Toronto. Before joining Thiokol, he served in the capacity of rubber compounder, development engineer, technical service engineer and latterly as manager of belting, hose, packing and tape sales for Dominion Rubber Co., Ltd.

Thiokol has entered the butyl rubber field in cooperation with Petroleum Chemicals, Inc., a company jointly owned by Cities Service Co. and the Continental Oil Co. Petroleum Chemicals is licensed by the Esso Research and Engineering Co. to manufacture butyl rubber. Thiokol is currently engaged in establishing a sales-service organization comprised of personnel experienced in laboratory and factory development of rubber products. Its activities will include broadening the market in uses favored by the properties and economics of butyl rubber. A key function of the new organization will be technical assistance to manufacturers to help them work out the best compounding and processing methods for butyl rubber.

DELBERT J. MASSEY, associated with the Monsanto Chemical Co. since 1950, has been appointed a project specialist in the Development Department of the Organic Chemicals Division.

KENNETH H. HANNAN, associated with the Union Carbide and Carbon Corp. since 1936, has been elected an executive vice-president.

WILLIAM B. PLUMMER has retired as president of the Indoil Chemical Co., Chicago, Ill., to become a private consultant in the petrochemical field with headquarters in New York City.

DOMENIC A. DITIRRO, formerly associated with the Ross Operating Valve Co., has been named manager of research and development of the Valvair Corp.

STUART ROESLER, vice-president and director of the Empire Trust Co., has been elected director of the H. O. Canfield Co., Bridgeport, Conn. Mr. Roesler is also a director of the Pantasote Co., the Virginia-Carolina Chemical Co., Lithium Corp. of America, and the Kawecki Chemical Co.

T. LAWRENCE CRONIN, JR., who was associated with the U. S. Rubber Co. from 1947 to 1953, has joined Greer Hydraulics, Inc., Jamaica, N. Y., as director of industrial relations.

JAY B. HARRIS, formerly a market representative for the Associated Merchandising Corp., New York, N. Y., has joined the Wooster Rubber Co. as sales manager of the Specialty Division.

THOMAS J. COOK, formerly plant engineer at the Goodrich tire manufacturing plant in Los Angeles, has been named manager of engineering of the B. F. Goodrich Tire Co.

MAX F. MOYER, formerly assistant manager, auto tire sales for the Goodyear Tire & Rubber Co., has been appointed manager of the Service Sales & Equipment Division.

DR. DONALD A. M. MACKAY, a specialist in applying spectrophotometric and chromatographic techniques to problem solving, has been advanced to associate director of research of the Evans Research & Development Corp., New York, N. Y.

H. H. KIECKHEFER, for the past several years assistant sales manager for the Wheelco Instruments Division, Barber-Colman Co., Rockford, Ill., has been named sales manager of the division.

ROBERT H. DHONAU and ARTHUR R. MCDERMOTT have been added to the staff of the Development & Service Department, Emery Industries, Inc., Cincinnati, Ohio. They will be concerned with the development of all new products as well as technical service for both the Fatty Acid and Organic Chemical Sales Departments.

JOHN F. ANDERSON, with the B. F. Goodrich Co. since 1928, has been appointed a research chemist in adhesives at the research center at Brecksville.

O. E. MILES and R. W. FITZGERALD have been advanced to two new executive positions in the tire sales organization of the Goodyear Tire & Rubber Co. Mr. Miles, formerly general manager of the Retail Stores Division, has been named sales manager, Tire Division, and Mr. Fitzgerald, formerly manager, tire sales, has been named general merchandising manager.

JOHN A. RAGGIO, associated with the Pioneer Products Division of the Witco Chemical Co. for the past eighteen years, has been appointed to the newly created position of general sales manager of the division.

WILLIAM L. GOSLING, operating manager for the General Tire Export Co., has announced his retirement. He had been associated with the General Tire organization since 1931.

Financial News

Goodyear Tire & Rubber Co.

Six Months to June 30: Net income of $30,655,683, which is equal to $3.02 a share, compared with $27,268,497, or $2.68 a share, in the corresponding period of 1955. The net income in the first half of 1956 was 12.4% over income in the first six months of 1955 and set a new record for the company. Consolidated net sales in the first half of the current year were $683,066,058, against $679,672,925 in the first half of the preceding year, also a new record. Goodyear's financial statement showed working capital of $455,143,636 on June 30, 1956, compared with $413,095,838 a year ago. The ratio of current assets to current liabilities stood at 5.5 to 1 against 5.3 to 1 last year.

National Rubber Machinery Co.

Six Months to June 30: Net profit of $289,728, which is equal to $1.48 per share, compared with $314,913, or $1.61 per share, in the corresponding period of the preceding year. Paul A. Frank, president, stated that the six-week strike of the Akron hourly employees was the sole reason why profits for the first six months of 1956 were not larger than for the same 1955 period.

New Jersey Zinc Co.

Six Months to June 30: Net income of $1,018,403, which is equal to 52c per share, compared with $2,563,691, or $1.31 per share, in the corresponding period of the preceding year. The company had a net loss of approximately $156,000 in the second quarter due to the effect of a two-month strike at the plants in Palmerton, Penna., and Depue, Ill.

Cooper Tire & Rubber Co.

Six Months to June 30: Net income of $301,287 compared with $180,627 in the corresponding period of the preceding year, a 67% increase in profit. Sales increased 27%, hitting $12,980,000 for the half year. A dividend of 25c a share was authorized by directors, payable August 20 to share holders of record August 13.

Brown Rubber Company

Six Months to June 30: Net income of $132,672, which is equal to 35c per share, compared with $426,891, or $1.13 per share, in the corresponding period of the previous year. Loss of sales volume as well as earnings is attributed to substantially reduced schedules from automotive industry customers.

Okonite Company

Quarter to March 31: Net income of $462,234, which is equal to $2.41 per share, compared with $251,398, or $1.40 a share, in the corresponding period of the previous year.

I. B. Kleinert Rubber Co.

Six Months to June 30: Net income of $275,000, which is equal to 92c a share, compared with $233,623, or 77c a share, in the corresponding period of the previous year. Net sales in the first six months of the current year amounted to $6,882,966, against $6,380,417 in the first six months of 1955.

Barry Controls, Inc.

Six Months to June 30: Net income of $180,515, which is equal to 36c per share of common stock, compared with $108,486 or 61c per common share, in the corresponding period of the previous year. Net sales for the first six months of 1956 totaled $1,348,510 against $1,219,534 in the same period of 1955.

Mansfield Tire & Rubber Co.

Six Months to June 30: Net income of $701,450, which is equal to $1.14 a share, compared with $993,668, or $1.74 a share, in the same period of the preceding year. Net sales for the first six months of 1956 totaled $31,593,710 against $38,468,754 in the corresponding period of 1955.

Armstrong Cork Co.

Six Months to June 30: Net income of $6,847,783, or $1.32 per common share, compared with $7,024,720, or $1.37 per common share, in the corresponding period of 1955. Net sales for the first half of 1956 totaled $123,289,000 against $122,569,000 in the same period of 1955.

Plymouth Rubber Co.

Six Months to June 30: Net income of $471,515, which is equal to 53c per share, compared with $312,422, or 35c a share, in the corresponding period of the preceding year. Net sales totaled $9,429,467 against $8,360,865 in the same period of 1955.

Garlock Packing Co.

Six Months to June 30: Net income of $1,256,541, which is equal to $2.79 a share, compared with $676,084, or $1.61 a share, in the first six months of the preceding year.

DeVilbiss Company

Quarter to March 31: Net income of $334,337, which is equal to 92c per common share, compared with $162,176, or 43c per common share, in the first quarter of 1955.

Anaconda Wire & Cable Corp.

Six Months to June 30: Net income of $5,133,679, which is equal to $6.08 per share, compared with $3,083,612, or $3.65 per share, in the corresponding period of the preceding year.

B. F. Goodrich Co.

Six Months to June 30: Net income of $21,507,367, which is equal to $2.41 a share on 8,913,006 shares of common stock, compared with $22,291,357, or $2.52 a share on the 8,834,402 common shares outstanding in the first half of 1955. Consolidated net sales amounted to $364,374,921, against $372,355,401 in the first half of 1955, a decline of 2.1%. Earnings of associate companies in which Goodrich owns less than a majority interest are included in the parent's net income only to the extent of dividends received. Estimated increase in Goodrich's equity in associate companies, not included in the income statement, was estimated at $1,700,000 in the first half of 1956.

Minnesota Mining & Mfg. Co.

Six Months to June 30: Net income of $17,670,767, which is equal to $1.06 per common share, compared with $15,781,268, or 96c per common share, in the corresponding period of the previous year. Net sales totaled $154,495,586, a gain of 17% over the $131,645,501 in the same period of 1955.

Sheller Manufacturing Corp.

Six Months to June 30: Net income of $820,210, which is equal to 86c per share, compared with $1,925,876, or $2.02 per share, in the corresponding period of the preceding year. Net sales declined to $21,810,760, from the record $28,369,198 volume in the same six month period of 1955.

Interchemical Corporation

Six Months to June 30: Net income of $2,330,312, which is equal to $2.67 a common share, compared with $2,183,280, or $2.53 a common share, in the corresponding period of the preceding year. Net sales amounted to $55,347,462, against $49,058,671 in the same six month period of 1955.

Seiberling Rubber Co.

Six Months to June 30: Net income of $452,820, which is equal to 85c a common share, compared with $450,407, or 84c a common share, in the corresponding period of the previous year. Net sales totaled $24,018,569, a gain of 11.7% over the $21,491,511 in the same period of 1955.

American Hair & Felt Co.

Six Months to June 30: Net income of $218,014, which is equal to $1.13 per common share, compared with $243,497, or $1.28 per common share, in the corresponding period of the previous year. Net sales totaled $4,299,838, against $4,284,679 in the same six month period of 1955.

Belden Manufacturing Co.

Six Months to June 30: Net income of $861,039, which is equal to $2.22 per share, compared with $647,427, or $1.68 per share, in the corresponding period of the preceding year. Net sales totaled $16,161,754, against $12,821,758 in the same six month period of 1955.

Goodall Rubber Co.

Six Months to June 30: Net income of $340,413, which is equal to $2.16 per share of common stock, compared with $214,020, or $1.50 per share in the corresponding period of the preceding year. Net sales in the first half of 1956 amounted to $6,109,-095 against $4,634,366 for the six months' period of the preceding year.

Hewitt-Robins, Inc.

Six Months to June 30: Net income of $513,313, which is equal to $1.50 per common share, compared with $485,271, or $1.57 per common share, in the corresponding period of the previous year. Net sales amounted to $25,616,250, against $21,479,-077 in the same period of 1955.

Great American Industries

Six Months to June 30: Net income of $358,542, which is equal to 21c a share, compared with $199,307, or 12c a share, in the same period of the preceding year. Net sales in the first half of this year totaled $7,636,396 against $8,094,740 in the corresponding period of 1955.

American Hard Rubber Co.

24 Weeks to June 17: Net income of $586,659, which is equal to $1.69 per common share, compared with $358,179, or 97c per common share, in the corresponding period of the preceding year. Net sales amounted to $13,122,321, against $9,616,-054 in the same period of 1955.

Kerite Company

Six Months to June 30: Net income of $646,326, which is equal to $2.53 per share, compared with $297,848, or $1.17 per share, in the comparable period of the preceding year. Net sales totaled $7,364,569, against $4,679,860 in the same six month period of 1955.

Columbian Carbon Co.

Six Months to June 30: Net income of $3,237,247, which is equal to $2.01 per share, against $3,147,619, or $1.95 per share in the corresponding period of 1955. Net sales amounted to $32,532,594, compared with $30,624,512 a year earlier.

O'Sullivan Rubber Corp.

Six Months to June 30: Net loss of $46,400 compared with a net income of $42,164 in the corresponding period of the previous year. Operations in 1956 periods were affected by a strike of production workers, the report stated.

United Carbon Co.

Six Months to June 30: Net income of $3,018,106, which is equal to $2.53 a share, compared with $2,510,138, or $2.10 a share in the first half of 1955. Net sales in the first half of 1956 amounted to $31,600,211 against $19,687,915 in the first half of 1955.

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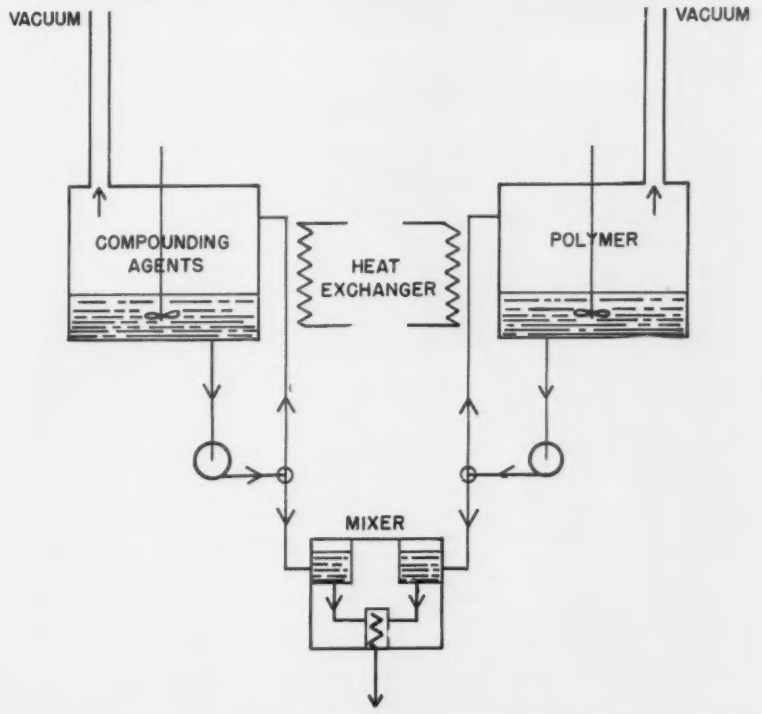


In his recent address before the 1956 Annual Meeting of the Molded, Extruded, Lathe Cut and Chemically Blown Sponge Rubber Subdivision of the Mechanical Division, Rubber Manufacturers Association at Hot Springs, Va., A. C. Stevenson, assistant director of the DuPont Elastomers Laboratory, noted that considerable work is now being done on fluid urethane rubbers. In this direction, he gave some data on both polyamine and polyglycol curing systems. Mr. Stevenson emphasized the point that the processing of the fluid urethane rubbers requires no pressure. To this end, he exhibited a flow chart (shown above) of a typical processing system, which should be of interest to many of those unable to attend the meeting.

Sherwin-Williams Buys Rubberset

Sherwin-Williams Co., Cleveland, Ohio, has announced that through newly created subsidiaries the company has acquired assets of the Rubberset Co., East Newark, N. J. and Rubberset Co. Ltd., of Canada. Operations will be continued as heretofore under the previous management with no changes in policy. Elwood M. Jones, Jr., will continue as top executive of the Newark and Canadian operations with W. B. Findlay as president of the Canadian subsidiary.

Farrel-Birmingham Co.

Six Months to June 30: Net income of $528,680, which is equal to $1.65 per share, compared with $1,062,938, or $3.32 per share, in the corresponding period of the previous year. Net sales totaled $22,481,831, against $21,912,897 in the 1955 period.

U. S. Rubber Reclaiming Co.

Six Months to June 30: Net income of $96,330 compared with $152,848 in the corresponding period of the preceding year.

Announces Two New Products

U. S. Cotton Oil Co., Inc., 194 Henderson St., Jersey City, N. J., has announced the availability of two new products, "LMC Succinic Acid" and "Primawax LMC". LMC Succinic Acid is a premium quality technical grade material with an extremely low metal content—less than 10 ppm of heavy metals. It is claimed to be of particular value to manufacturers of elastomers, plasticizers, plastics, etc., because of its low metal content which minimizes catalytic effects and oxidation. Primawax LMC is an exceptionally low metal content hydrogenated castor oil, flaked. With less than 10 ppm of heavy metal, it is of value in the rubber, vinyl and cellulose nitrate fields as well as in lubricant greases.

Celanese Corp. of America

Six Months to June 30: Net income of $6,185,602, which is equal to 65c a common share, compared with $7,221,797, or 83c a common share, in the corresponding period of the previous year. Net sales amounted to $94,421,267, against $93,248,-262 in the comparable period of 1955.

Haden Appointed General Manager

Russell L. Haden

Russell L. Haden, formerly general manager of the Battery Separator Division of the Dewey & Almy Chemical Co., Cambridge, Mass., has been appointed general manager of the Organic Chemicals Division. Mr. Haden will be responsible for the division's manufacturing plants in Cambridge and Acton, Mass., as well as for all sales and research activities. He has been with Dewey & Almy since 1944, coming from the War Production Board, Office of Rubber Director, where he worked on the development of synthetic rubber plants. Previously, Mr. Haden had been employed as a chemical engineer with Proctor & Gamble, and as chief chemist for the Continental-Mexican Rubber Co. in Torreon, Mexico. Mr. Haden has held various positions with Dewey & Almy, starting as a superintendent in the Manufacturing Department. Later assignments included plant manager for units in Lockport, New York, and Acton. He holds B.S. and M.S. degrees in chemical engineering from the Massachusetts Institute of Technology.

G-E Silicone O-Ring Seals

Silicone rubber O-ring seals are now being manufactured in standard AN and MS production molds designed for organic rubber, making possible three-fold savings, reports the Goshen Rubber Co., Inc., of Goshen, Ind. The compounds being used are the improved Class 300 stocks produced by the Silicone Products Department of the General Electric Co. These new silicone materials are said to be the first to have the same shrinkage as organic rubber. Cost cutting advantages cited by Goshen for Class 300 silicone O-rings produced to MIL and AMS material specifications include: (1) elimination of special tooling previously needed for silicone rubber; (2) greater production through the use of larger capacity tooling than previously feasible and, (3) improved uniformity providing closer conformity to AN and MS dimensions, greatly decreasing losses due to rejections.

"Reinforcement of Standard Cold Rubber with Variable Quantities of Philblack I" is the title of a report issued by the Phillips Chemical Co., Akron, Ohio. Ask for Rubber Chemicals Bulletin No. 28.

Wire and Cable Symposium

The fifth annual symposium on "Technical Progress in Communication Wires and Cables," jointly sponsored by the Signal Corps Engineering Laboratories and the wire and cable industry, has been scheduled for December 4, 5 and 6 at the Berkeley-Carteret Hotel in Asbury Park, N. J. The program will cover developments in the fields of wire and cable constructions, their characteristics and uses; conducting, insulating and jacketing materials; manufacturing equipment, processes and techniques; field construction practices, and end uses in operating systems. Howard L. Kitts, Telecommunication Division at the Fort Monmouth Laboratories, will be symposium chairman, with Howard F. X. Kingsley as co-chairman. Other committee members are C. T. Wyman (Bell Telephone Laboratories), George Hamburger (Copperweld Steel), Bjorn Jore (Anaconda Wire), Vincent McBride (Plastic Wire and Cable), E. J. Burrough, (DuPont), and Ray Blain (Army Signal Communication Engineering Agency). Mr. Kitts invited those interested in attending the symposium and desirous of additional details to contact him or Mr. Kingsley at the laboratories, Eatontown 3-1000, Extensions 51565 or 51564, or to write the Symposium Committee, Communications Department, Signal Corps Engineering Laboratories, Fort Monmouth.

One-Piece Aluminum Wheel

A forged disc aluminum wheel for tubeless truck tires has been placed on the market by the Aluminum Company of America, Pittsburgh, Penna. The one-piece leakproof construction of the 22.5 foot by 7.50 foot wheel retains all present aluminum advantages in a design offering complete compatibility with tubeless tires. Combining round and true rims with high thermal conductivity, aluminum wheels provide easier steering, smoother riding and lower maintenance costs, coupled with the assurance of cooler running and longer lasting tires, the company states. The new wheel provides maximum brake drum clearance, and the thicker rim sections are machined to assure dimensionally perfect seats for tire beads. Added heft at the rim prevents air loss due to denting or distortion. Tire changes are easier because the wheel has been constructed so that the "dish" does not interfere with operation of tire irons. Moisture inside the tire will not rust the aluminum rim. On manual changes, tires slip on and off without binding.

Goodrich Promotes T. H. Smith

Thomas H. Smith, previously purchasing agent at the B. F. Goodrich Co. plant at Miami, Okla., has been appointed manager of the Chemicals and Pigments Purchasing Department at Akron, Ohio. Mr. Smith, a Purdue University graduate in chemical engineering, also attended DePauw University before joining Goodrich in 1949. After training in the Purchasing Department, he was transferred to the Marietta, Ohio, plastics products plant where he served as assistant buyer. Mr. Smith was transferred to the Miami, Okla., plant in 1950.

Joins U. S. Rubber Reclaiming

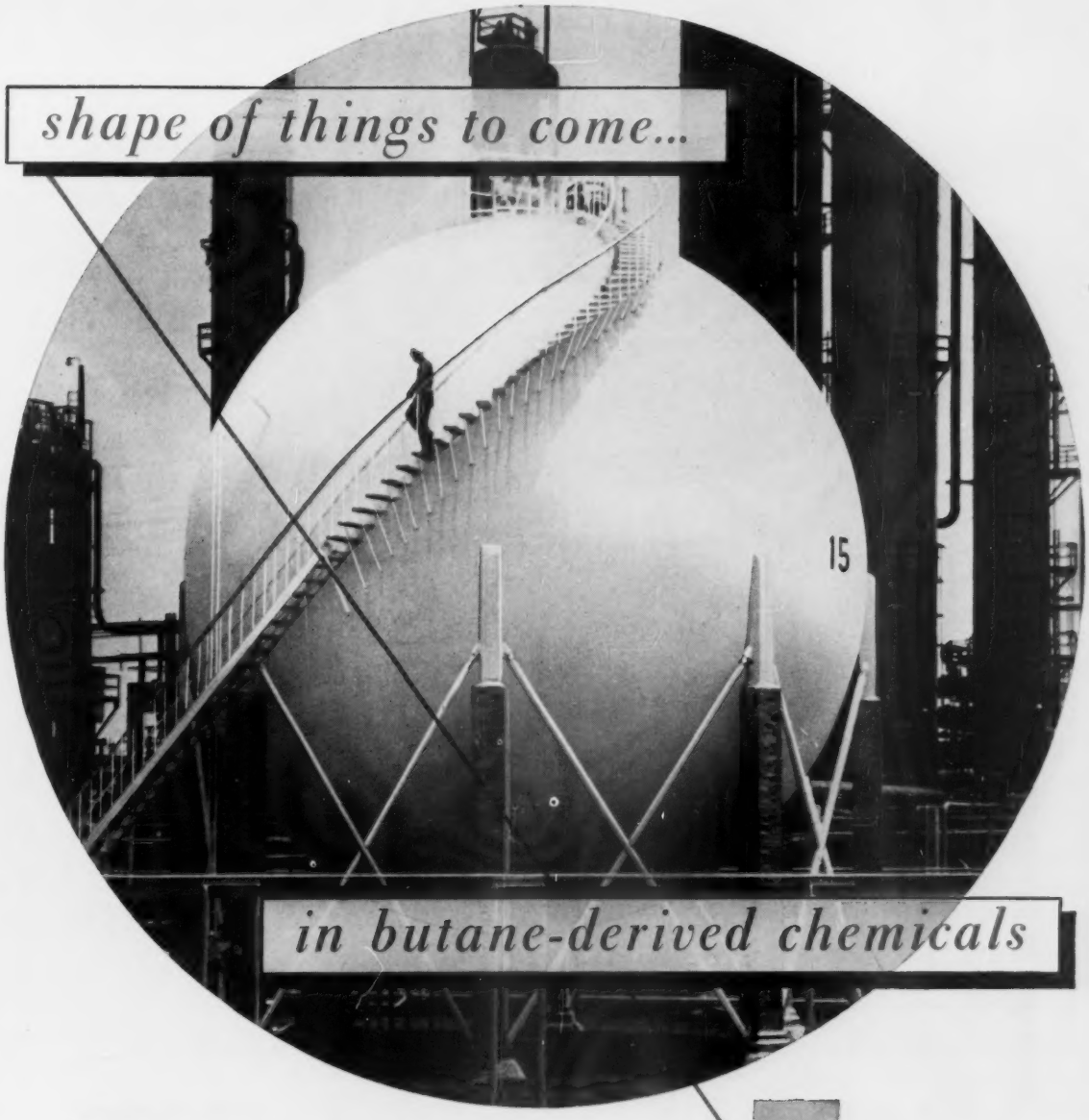
James J. McCarthy

James J. McCarthy has joined the technical sales force of the U. S. Rubber Reclaiming Co., Inc., Buffalo, N. Y. Mr. McCarthy formerly worked in the Synthetic and Development Compounding Divisions of the Firestone Tire & Rubber Co. He graduated from the University of Detroit in June, 1953, with a B.S. in chemistry and has taken post-graduate courses in rubber technology at the University of Akron. Mr. McCarthy is now covering the central and southern states for U. S. Rubber Reclaiming.

New Goodyear 14-Inch Tire

Goodyear Tire & Rubber Co., Akron, Ohio, has revealed a production backlog of new 14-inch diameter tires in sufficient quantity to satisfy original equipment demands for 1957 cars and to meet anticipated dealer replacement needs. Called the "Custom Super-Soft Cushion," the tire is already being shipped to Detroit warehouses for ultimate use by automobile manufacturers. Dealer distribution is scheduled to begin in the fall. Although the wider cross-sectioned 14-inch tire is larger and weighs size for size in the range of a pound more than its 15-inch predecessor, it is smaller in over-all height. Softer as the result of greater air volume and lower air pressure, the new tire is designed basically to be operated at 22 pounds per square inch, an 8% decrease when compared to 24 pounds for present 15-inch tires. Tire section has been increased an average of one inch and rim width hiked a half-inch. Loaded radius, or axle height, has been reduced approximately a half-inch. Greater width of the 14-inch tire has called for a new range of size classifications. A 7.50-14 tire at 22 psi compares with the present 6.70-15 tire at 24 psi; 8.00-14 with 7.10-15; 8.50-14 with 7.60-15; 9.00-14 with 8.00-15, and 9.50-14 with 8.20-15. The new tubeless tire is being constructed of both nylon and rayon cord. A new Twin-Grip tread design has 8,640 traction edges.

Take a long time for this copy of RUBBER AGE to reach your desk? Use the coupon on page 1065.



Additions and betterments now being made at our Houston plant will increase capacity and add flexibility in end-product output. Soon we will produce substantially more butadiene and also offer the isomers n-butylene 1 and n-butylene 2.

Research done at this time can result in worthwhile commercial products now that an ample supply of raw materials at attractive prices will soon be available.

Petro-Tex will do everything possible to foster the development of products based on butane-derived chemicals. Discussion is invited.

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CAPITAL EXPENDITURES BY SELECTED RUBBER COMPANIES SINCE WORLD WAR II

According to the latest Industry Survey conducted by Standard and Poor's Corp., outlays for plant expansion and improvement by the rubber industry since the end of World War II have been substantial. In general, two major programs were involved, the first in the immediate post-war years and the second larger one following the Korean outbreak. Year-to-year increases in expenditures in 1955, principally by Firestone, Goodyear, Goodrich and U. S. Rubber, partly reflected the acquisition of former government-owned synthetic rubber plants. The following tables show Standard and Poor's breakdown of capital expenditures for selected companies.

Capital Expenditures in Millions of Dollars

	Armstrong	Baldwin	Dayton	Firestone	General	Goodrich	Goodyear	Hewitt-Robins	Lee	Seiberling	U.S.
1955	1.92	0.58	1.72	55.72	9.00*	20.38	70.08	—	1.41	0.93	35.28
1954	2.10	0.59	1.56	43.69	7.17	28.03	33.08	1.99	0.21	1.37	31.69
1953	3.28	0.27	3.02	43.68	6.26	23.42	50.37	0.81	1.10	1.28	26.03
1952	2.31	0.67	2.93	42.95	4.57	21.92	52.76	1.05	2.07	0.87	26.26
1951	2.61	0.35	3.40	36.58	14.42	19.05	44.62	1.77	1.20	0.65	21.02
1950	0.50	0.35	1.15	28.11	3.39	12.25	30.06	0.20	0.59	0.91	15.23
1949	—	0.35	0.76	19.16	2.37	12.14	19.60	—	0.30	0.40	16.18
1948	—	0.35	0.95	21.62	3.70	11.73	24.62	—	0.63	0.54	18.36
1947	—	0.50	1.26	27.02	2.84	23.33	35.38	—	0.80	0.86	27.57
1946	—	0.76	2.44	27.79	2.87	24.62	32.63	—	0.83	1.43	24.65
1945	—	—	2.65	10.71	—	9.47	24.28	—	2.15	1.45	26.64
Year Ends:	Sep.	June	Oct.	Oct.	Nov.	Dec.	Dec.	Dec.	Oct.	Dec.	Dec.

Capital Expenditures as a Percentage of Gross Plant†

	Armstrong	Baldwin	Dayton	Firestone	General	Goodrich	Goodyear	Hewitt-Robins	Lee	Seiberling	U.S.
1955	8.2	9.8	6.8	15.5	11.3	7.3	12.5	—	9.2	6.4	8.4
1954	9.9	11.1	6.6	13.6	10.2	10.6	6.6	17.8	1.5	9.8	8.1
1953	17.2	5.6	15.0	14.9	12.0	10.3	10.6	8.7	8.0	9.9	7.1
1952	14.3	14.5	16.7	16.1	10.2	10.4	12.1	11.6	15.8	7.3	7.6
1951	18.7	8.6	21.2	15.5	34.0	9.9	11.4	22.1	10.4	5.8	6.5
1950	5.1	9.3	8.0	13.3	11.3	6.9	8.5	2.9	5.3	7.4	5.0
1949	—	9.6	5.7	9.9	8.2	7.1	5.9	—	2.8	3.3	5.6
1948	—	10.1	7.5	11.6	13.3	7.0	7.8	—	6.0	4.5	6.4
1947	—	15.9	10.5	15.5	12.6	17.5	12.3	—	8.5	16.3	9.9
1946	—	26.0	22.4	17.6	11.5	15.0	12.0	—	7.9	7.5	10.1
1945	—	—	29.9	7.6	—	8.0	10.3	—	23.4	18.3	12.7

Note: (†) Capital expenditures during fiscal year divided by gross plant at the end of the fiscal year. * Approximate.

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HARD RUBBER DUST

Muehlstein offers complete grinding facilities and strict laboratory control for hard rubber dust—manufactured and ground to your specifications. You have your choice of all standard grades regularly available. Don't forget, too, Muehlstein offers you a complete technical service with modern, newly-expanded laboratory facilities ready to help solve your manufacturing problems.

Other Muehlstein products include Virgin and Reprocessed Plastics • Scrap Rubber • Crude Rubber • Synthetic Rubber.

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New Latex Removal Technique

A new technique for removing adhered latex from reactors in synthetic rubber plants has been perfected by Solvent Service, Inc., of Painesville, Ohio, specialists in the hydraulic and chemical cleaning and descaling of industrial equipment. The process involves a novel adaptation of Solvent Service's high-pressure water-jetting technique, a product of the firm's continuing research program. With the new method, Solvent Service technicians remove latex which has adhered to reactor walls, coils and agitators in from four to six hours. In contrast, standard cleaning methods mean shutting down reactors for as long as a week and a complete cleaning cannot always be guaranteed.

The company has also announced the acquisition of accounts of the Lemont Chemical Co., of Lemont, Ill. Acquisition of the Lemont accounts extends Solvent Service's operations to cover Indiana, Illinois, Wisconsin, Michigan, Minnesota, Iowa, South Dakota and the Upper Peninsula and southwest sections of Michigan. The new Midwest operation is based in East Chicago, Ill., with a branch office in Milwaukee, and is equipped to render a complete range of services. Heading up the new regional organization is Reece Kincaid, area sales manager, a veteran of thirteen years in the highly specialized field of chemical descaling. He is assisted by Robert Kremer, sales engineer, and Herbert Ohman, sales and service engineer.

New Lead-Free Zinc Oxide

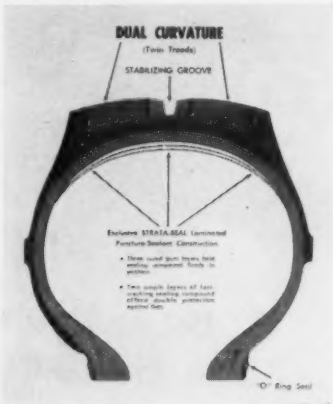
American Zinc Sales Co., Columbus, Ohio, has announced a new type of lead-free zinc oxide to be marketed under the trade name "Azodox." The chemical and physical properties of the "Azo" brands of lead-free American Process zinc oxides have been maintained in Azodox, with the added advantage of higher apparent density, the company states. This results in requiring only half the storage space of the corresponding brands of Azo and conventional zinc oxides. The company also claims a faster incorporation of Azodox in rubber in Banbury mixers and open mills with improved dispersion. It flows more freely and is less dusting than ordinary zinc oxides. Azodox is already in production at the Columbus, Ohio, plant, and similar facilities are under construction at the Hillboro, Ill., plant.

Kuhlen Named to New Post

D. M. Pratt, vice-president and sales manager of the Marbon Chemical Division of the Borg-Warner Corp., has announced the appointment of Walter H. Kuhlen as technical sales representative for the Pennsylvania, New York and Southern Area territory. After serving two years in the U. S. Coast Guard, Mr. Kuhlen worked as a sales engineer for Timken Automatic while attending Northeastern University in Boston, Mass. Prior to receiving his B.S. degree in business administration, Mr. Kuhlen experienced two years of mechanical engineering.

General Announces Dual 90 Tire

General Tire & Rubber Co., Akron, Ohio, has unveiled a new tire which in principle is said to give the driver the effect of two tires on one wheel. Called the "Dual 90," the tire is the result of two years of concentrated research and development. The Dual 90 is said to be the first tire in the history of the industry to be constructed with dual curvature, an engineering accomplishment that results in two distinct radii within each tire. This means that the tire has two separate points of contact with the road instead of one. Physically, the Dual



This cross-sectional view of the Dual 90 shows the twin treads of the new tire and the Strata-Seal sealant construction. The new tire is constructed with the patented "O" Ring Seal used on other tires produced by the company.

90 looks strikingly different than the conventional tire. It has two distinct treads with a groove running down the middle. There have been other tires marketed with twin treads, but the Dual 90 is the first to be designed with separate curves. General Tire engineers say the new tire will provide greater safety for the driver than any tire now on the road. Tests have shown that the tire's twin treads coupled with the dual curvature enable the unit to hold the road far more firmly than any tire in existence.

The company states that the tire's unique construction plus the tread compound in the Dual 90 makes it the quietest tire on the road. Company engineers have also made the carcass of the Dual 90 with cord 50% stronger than any other cord previously used by the company. The "double" aspect of the Dual 90 also extends to the puncture sealant. A new process has been introduced that substantially minimizes the tendency of the sealant to thicken in the center. It is called "Strata-Seal." Strata-Seal is a laminated type of sealant construction designed to seal punctures effectively. Basically, it is comprised of two layers of sealant separated and walled in by layers of high-strength rubber. This method permits the use of a softer kind of sealant, because the central and outer layers of rubber control the movement of the cement.

Cosden to Market Polybutene

Cosden Petroleum Corp., Big Spring, Tex., has announced that it is setting up marketing and distribution facilities for its own multiviscosity polybutene under the trade name "Polyvis." This expanded operation was made possible by the construction of a new polymerization plant at Big Spring, said to have an annual capacity of 1,000,000 gallons of low-viscosity polybutene. Since the fall of 1953, Cosden has operated a small, semi-commercial pilot plant producing polybutene. The decision to erect a new plant employing several new methods of operation was based on data and experience gained from the operation of this installation. The 1,000,000 gallon capacity of the new plant will represent approximately a 25 percent increase in existing U.S. capacity, the company states.

Cosden's continuous process utilizes a C4 feed stream from which a heart-cut of isobutene or isobutylene is fractionated. The polymerization catalyst employed is anhydrous aluminum trichloride. Resulting reactions take place at temperatures as low as —30°F. to —40°F., depending on the desired viscosity of the product. Saybolt viscosities of 100 seconds/100°F. to 20,000 seconds/210°F. are contemplated. Polyvis can be produced with an excellent color, essentially clear, Cosden reports. It is not subject to normal atmospheric oxidation; therefore, it has good aging characteristics and does not deploymerize under long storage. Polybutene has a high degree of tackiness in the high-viscosity ranges but does not become gummy or waxy.

Introduces New Tire Valves

Bridgeport Brass Co., Bridgeport, Conn., has developed a complete line of rubber-base replacement tire valves for passenger car, truck, bus, tractor and bicycle tubes. They are said to provide an equally positive valve-to-tube bond whether applied cold or with heat. One feature of the cold-hot application is a new specially compounded gum ply protected by a smooth red polyethylene covering. Another feature is a prescored cover that can be removed faster and easier. In the simple application, the tube is first prepared in the usual manner. For cold bonding, the valve is simply positioned and stitched on thoroughly after removing the prescored protective covering. To apply hot, the vulcanizing procedure for ordinary replacement valves is followed.

To Build Polyethylene Unit

Spencer Chemical Co., Kansas City, Mo., has announced that it will construct a facility to produce semi-commercial quantities of high density polyethylene resins, using the Standard Oil Co. (Indiana) low pressure process. The announcement coincides with a statement by Indiana Standard that Spencer has become the second licensee of its low pressure process for making polyethylene and polypropylene. The process, according to Indiana Standard and Spencer, is protected by more than 20 issued patents, as well as a number of pending applications, covering polyethylene, polypropylene, and copolymers of ethylene and propylene.

The ring of quality

Colorful, low-cost sidewall rings that can be quickly installed on tires are now contributing to the luxury-look of today's new cars. They're inexpensive, stay brilliant for life, wash bright in seconds, out-last tires. A product of The Bearfoot Sole Co., Wadsworth, Ohio, these rings are available in a variety of colors or in white. They're made of Enjay Butyl Rubber because no other rubber tested could equal its performance in severe laboratory and road tests. The Enjay Butyl label on the Flex-A-Wall® carton assures the buyer of outstanding quality.

Find out for yourself the many technical advantages of Enjay Butyl—the rubber that is outperforming natural and other types of rubber in a wide variety of industrial and consumer applications. For full information, and for technical assistance in the use of Enjay Butyl, write, wire or phone the Enjay Company.

ENJAY BUTYL

ENJAY *Pioneer in Petrochemicals*

ENJAY COMPANY, INC., 15 West 51st Street, New York 19, N. Y.

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Enjay Butyl is the super-durable rubber with *outstanding* resistance to aging • abrasion • tear • chipping • cracking • ozone and corona • chemicals • gases • heat • cold • sunlight • moisture.

Reports on Natural Replanting

Labeling his figures as reflecting the most important development in natural rubber in recent years, Dr. George F. Bloomfield, in the current issue of "Rubber Developments," a quarterly devoted to natural rubber advances, highlights the dramatic production increases that can take place as the result of replanting. "From 1930-40," he points out, "average annual rubber production in Malaya was around 300 pounds per acre, but by 1950 some replanted areas were already yielding well over 1000 pounds per acre and the over-all average was moving upward. Even 2000 pounds per acre has been exceeded in some areas."

Casting an eye to the future results of such production, the scientist, who heads the Chemical Division of the British Rubber Producers' Research Association, notes that the modern seed stock now being used for replanting should produce rubber at about half the rates that prevail for older, low-yielding trees. Aside from lowering costs, the new high-producing stocks greatly increase the potential production of areas using such plantings. In Malaya right now, according to the author, less than one-third of the total planted acreage (on estates of more than 100 acres) is accounting for more than half of the total production. In a market looking forward to world rubber consumption of 3,500,000 tons and upwards by 1960, this potential for increased natural rubber production is a basically important factor in evaluating the future consumption relationship between natural and synthetic rubbers. Copies of "Rubber Developments" may be secured from the Natural Rubber Bureau, 1631 K St., N. W., Washington 6, D. C.

Bekaert Steel Wire Formed

The formation of the Bekaert Steel Wire Corp. as a New York corporation and as a subsidiary of Trefileries Leon Bekaert, Zwevegem, Belgium, has been announced by Alex J. van Goylen, who has been named president of the new corporation. New offices of the firm have been established at 655 Madison Avenue, New York, N. Y. Bekaert Steel Wire Corp. will render technical service and conduct general administrative work in connection with Bekaert products in the U. S. In addition to steel wire products, Bekaert also sells tire cord to American tire manufacturers.

Dow Corning Silicone Defoamer

Dow Corning Corp., Midland, Mich., has announced the development of a new faster-acting, more stable silicone defoamer "Antifoam B," which is claimed to be generally effective at concentrations in the range of 3 to 30 ppm. Instantly dispersible in aqueous systems, Antifoam B may be added "as is" without stirring or agitation. Because it has extremely small particle size, it also stays in suspension longer. Good for continuous processing, it will not oil out, plate out, settle or precipitate in most applications, the company reports.

Monsanto-England Personnel

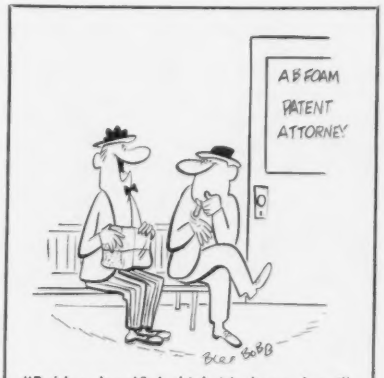
D. R. Mackie, managing director of Monsanto Chemicals Ltd., London, England, has announced the following appointments to meet the organizational requirements of the company's development program: W. M. Thompson, director of purchases, to sales director; J. S. Brough, chief engineer, to general manager of production; J. S. Hunter, sales controller, to general manager of development; W. E. Hamer, manager of the Research Department, to general research manager; J. M. Kershaw, project manager, to chief engineer; D. C. M. Salt, sales controller, to general manager of sales; G. Dodd, director and general manager of Monsanto Plastics Ltd., to controller of purchases, Monsanto Chemicals Ltd.; E. L. Pixton, sales controller of Monsanto Chemicals Ltd. and a director of Monsanto Plastics Ltd., will promote the present and future marketing interests of Monsanto Plastics Ltd., and O. W. Murray, chief construction engineer, to deputy chief engineer.

Dresser Acquires Guiberson

Dresser Industries, Inc., of Dallas, Texas, has acquired the assets of the Guiberson Corp. of the same city. The consideration was about 110,000 shares of common stock, which closed on the New York Stock Exchange on August 23 at $85.12½. No change in personnel or general policies of Guiberson is contemplated. Gordon Guiberson will remain as president of the concern and becomes a Dresser director. Guiberson was founded in 1919 and produces a line of mechanical goods, principally oil well specialties. Dresser is one of the country's largest suppliers of equipment and technical services for the oil, gas and chemical industries.

Recent DuPont Publications

The Elastomers Division of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., has released several new technical publications. Report BL-314 is on the subject of "Easily Inflatable Neoprene Balloons," report BL-315 covers "High Tear Strength Neoprene" and report BL-316 covers "Tetrone A." Report No. 56-1 is on "Neoprene Type WX." Copies of these technical reports are available from the company.



"Rubber band? I think it's been done!"

New Goodyear Laboratory

A new rubber development laboratory costing more than $80,000 and designed to provide increased sales service and development for the rubber industry has been put into service by the Chemical Division of the Goodyear Tire & Rubber Co., Akron, Ohio. An addition to the company's present rubber development facilities, the new laboratory will be used to process black stocks. Previous facilities are now devoted solely to the development of light colored rubber compounds. All Chemical Division development personnel have access to the space and equipment of both labs. An important piece of new equipment is an extruder with a 1½-inch diameter screw and is being used for the extrusion of both black and light colored stocks. A dynamic flex testing machine also has been installed. This device is used for outdoor exposure tests of rubber compounds in conjunction with a static tester which has been in use for some time. Use of both devices enables development personnel to simulate more closely operational conditions to which rubber compounds are subjected. Tests include flex, fatigue, weather aging and ozone deterioration under both static and dynamic conditions. Other major new equipment added to the new facilities includes a 16-inch mill, two small 12-inch mills, a Banbury mixer capable of handling 2,500 cc batches and an open steam vulcanizer for curing extruded goods. A two-deck curing press with 24 by 24-inch platens and a compounding room to prepare individual batches also have been included in the new lab.

Building Sulfuric Acid Plant

Garfield Chemical & Manufacturing Corp., Salt Lake City, Utah, a jointly owned facility of the American Smelting & Refining Co. and the Kennecott Copper Corp., both of New York, N. Y., has announced the construction of its fifth contact process sulfuric acid plant at Garfield, Utah. The new addition will expand production of sulfuric acid to 1,100 tons a day. The plant will be located at the Garfield Smelter of the American Smelting & Refining Co. and will be operated by ASARCO personnel. It will use as raw material sulfur dioxide gas produced by the Garfield Smelter copper converter operation. Output of the new plant is expected to go entirely to growing intermountain area industry, according to ASARCO.

Evans To Study Adhesion

A fundamental study of adhesion has been initiated by the Evans Research and Development Corp., chemical consultants of New York City, under a contract granted by the Wright Air Development Center, Air Research and Development Command. The first phase of this research program calls for the determination of surface-free energies of polymers and metals by use of solid state creep. Specialized instruments for this purpose have been designed by the Physics Department and are now under construction at the Evans Research Laboratories.

Naugatuck Butadiene-Styrene Latices

Leading name in Latex for the Foam Sponge and Tire Industries

Made in our own synthetic rubber plant, Naugatex® R-S latices are characterized by excellent mechanical stability, good color and superior aging. In general, their particle size is considerably smaller than that of natural rubber latex.

By varying the ratio of styrene to butadiene, the molecular weight of the polymer, the type of emulsifier system and the temperature of polymerization, Naugatuck chemists have given these Naugatex latices a variety of characteristics not possible in natural latex. The following specific types are in wide demand for use in the foam sponge industry, and in tire cord solutions—with or without the addition of Naugatuck's Pyratex® vinyl pyridine latex:

NAUGATEX 2000—A medium-solids, "hot" latex of about 50% styrene and of intermediate Mooney viscosity. For tire cord solutioning.

NAUGATEX X-765—A "cold" latex of small particle size. Polymer is about 25% styrene, of high Mooney viscosity. Developed to provide the advantages of low-temperature polymerization, it is used in some tire cord solutioning formulas.

NAUGATEX 2105—A high-solids, "cold" latex of about 25% styrene and a Mooney viscosity of 140. Has better color and uniformity than previous cold latices. Is the most successful we have yet developed for foam sponge manufacture.

For more complete details contact the Naugatuck branch office nearest you or write direct to the home office at Naugatuck.

United States Rubber

Naugatuck Chemical Division

Naugatuck, Connecticut

BRANCHES: Akron • Boston • Chicago • Memphis • New York • Philadelphia • **Mfg.:** Naugatuck • Gastonia • Los Angeles • **CANADA:** Latex Div., Dominion Rubber Co., Ltd., Montreal • **Cable:** Rubexport, N. Y. Rubber Chemicals • Synthetic & Reclaimed Rubber • Plastics • Agricultural Chemicals • Latices

News in Brief

In order to protect late-ripening tomatoes from adverse weather, Bakelite has developed a light gray perforated vinyl film which reflects large proportions of heat rays from the sun but allows growth-stimulating rays to penetrate.

Hexamine in two grades has been made available by the Chemical Division of Merck & Co. Each grade, either technical granular or technical power, assays 99% hexamine.

Poly Products, Inc., Dayton, Ohio, a Junior Achievement group sponsored by Dayton Rubber, expects sales to reach $1,750 with the season's end in May. Junior Achievement grosses throughout the country average about $400.

Goodyear's Packaging Film Department has announced the development of "75ST Shrink Tite Pliofilm," a specially designed film which has the ability to shrink approximately 18% when heat is applied.

Adhesive Products Corp., New York, N. Y., has announced the development of "No. 3734 Griptex" which is said to make possible the lamination of leather to itself without the need of stitching.

A new safety data sheet on propylene has been made available by the Manufacturing Chemists' Association, Inc., 1625 Eye St. N.W., Washington 6, D. C., for 30c each. Ask for Data Sheet SD-59.

A new bulletin covering its line of liquid stabilizers, Stabelan 110, 115 and 120, may be had by writing the Harwick Standard Chemical Co., Akron, Ohio.

Alta Engineering Co., Denver, Colo., has been appointed exclusive sales engineering representative for Tenney Engineering, Inc., Union, N.J., in the Rocky Mountain area.

The "Voice of Firestone" has been chosen for the George Foster Peabody Radio-Television Music Award for 1955 for "highest sensitivity not only in the matter of superb program standards but also in its understanding of advertising properties."

Dow Corning has announced the availability of "4X Compound," a non-melting, non-freezing and non-gumming silicone lubricant for rubber shock mountings, weatherstripping, etc.

Bradley Container Corp., Maynard, Mass., has developed a new can-like container, "Bracon 2ME," with flexible sides made of Bakelite polyethylene which is designed for packaging a variety of liquid or powdered products.

Water seepage of two to three gallons per minute was virtually eliminated by lining a 5,000-gallon concrete diesel-electric plant cooling tank with Krene plastic sheeting.

Acheson Colloids Co., Port Huron, Mich., has issued a new series of technical bulletin covering the use of "dag" colloidal dispersions in metal casting, metalworking, and other applications.

Goodyear Aircraft has announced another major contribution to the electronic differential analyzer field with the introduction of a new analog computer, the "GEDA A14", that combines practically unlimited linear and nonlinear computing capabilities.

The Silicone Products Department of G-E has introduced a two-color lithographed drum which features a special lining to provide the contents maximum protection against contamination and corrosion.

Adhesive Products Corp., New York, N. Y., has announced the development of "Stix-Grip" contact cement which makes it possible to adhere plastic laminates to wood without the use of clamps or presses.

According to the Bureau of Public Roads, more than 46,000,000 of the nation's 61,000,000 vehicles are registered in those states which have no official, statewide program to periodically check vehicle condition.

"Effect of Linear Pressure on Rubber Covered Squeeze Rolls" is a new technical report available from the Rodney Hunt Machine Co., Orange, Mass. Ask for Industrial Engineering Report No. 9.

Firestone has introduced a new line of slip-on sidewalls in white and a variety of colors. The sidewalls are easily installed and stay secure at any speed, the company states.

Rubba, Inc., New York, N. Y., has announced the development of "Rubbatex Rubber Fibre Coating," a liquid rubber coating for rubberizing sisal pads, hair felt and wadding. It is self-vulcanizing, can be air dried or oven dried with a minimum of heat, and is non-inflammable.

Columbian Carbon has started construction on its new Akron, Ohio, headquarters at 452 East Market Street. The company is also building a carbon black operations headquarters in Monroe, La.

"Piccopale A-1 Emulsion" is the title of a PICCO bulletin page issued by the Pennsylvania Industrial Chemical Corp., Clairton, Penna. The bulletin describes ten properties of this latex paint modifier.

Thwing-Albert Instrument Co., Philadelphia, Penna., has published a leaflet containing illustrations and brief descriptions of 31 instruments the company makes for testing plastics, textiles, paper and other materials. Ask for leaflet P-560.

A new solvent-activated patching material impregnated with Bakelite vinyl resins is produced by Alvin Products, Inc., Worcester, Mass., as a home repair kit that provides an inexpensive way to repair torn canvas, leather, and even wood or metal.

The Goodyear Tire & Rubber Co. radio program, "The Greatest Story Ever Told," has been honored by the General Federation of Women's Clubs for "stressing spiritual values."

Manufacturing Chemists' Association, Inc., Washington, D. C., has published two new safety data sheets giving properties and essential information for the safe handling and use of arsenic trioxide and phthalic anhydride. Ask for booklets SD-60 (arsenic trioxide) and SD-61 (phthalic anhydride).

"Sunvis 700 Oils" is the title of a technical bulletin issued by the Sun Oil Co., Philadelphia, Penna., telling how to clean sludge out of hydraulic and lubrication systems without shutting down machines. Ask for Technical Bulletin Number 44.

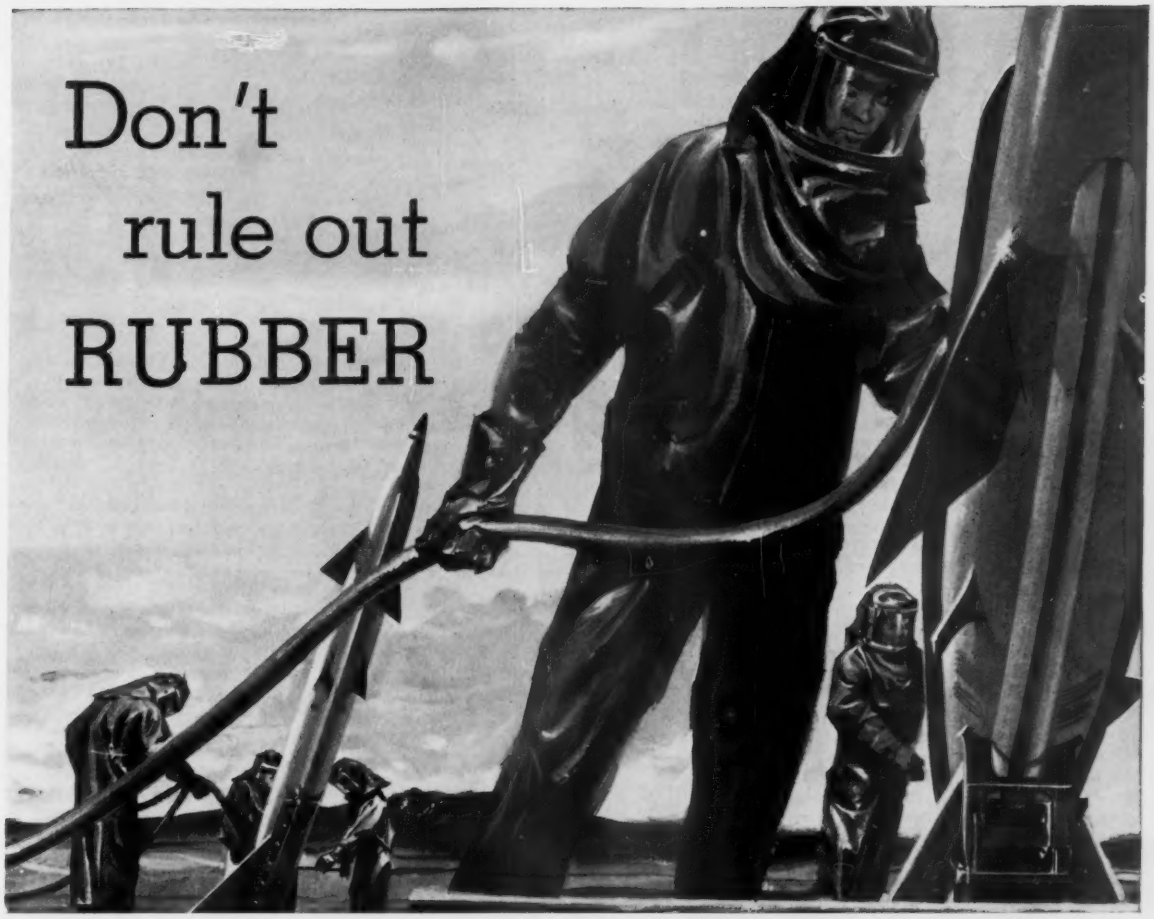
The Chicago, Ill., sales offices of the Chemical Manufacturing Division and the Chimney Division of the M. W. Kellogg Co. are now located at 221 North LaSalle Street. The telephone number is Central 6-2871.

A new 90 durometer synthetic material, Parker O-ring compound 49-091, has been developed by the Parker Rubber Research & Development Laboratory for molded seals in service up to 300°F. with MIL-L-7870A grease for lubricating aircraft instruments and MIL-L-6083 oil for preservative purposes in hydraulic equipment. The new material is also recommended for use with MIL-L-7808A and MIL-L-5606 oil up to 250°F.

"Aluminum Chloride, Anhydrous" and "Toluene" are the titles of two new safety data sheets issued by the Manufacturing Chemists' Association, Inc., Washington, D. C., describing the properties and essential information for the safe handling and use of the two chemicals. Ask for copies of SD-62 (aluminum chloride) and SD-63 (toluene).

Additives which improve ozone resistance of GR-S type rubber polymers as much as tenfold are described in a 105-page research report obtainable from the Office of Technical Services, U.S. Department of Commerce, Washington 25, D. C. Ask for Report PB 111722, "Development of Ozone and/or Oxygen Resistant Polymers," price $2.75.

Goodyear Tire & Rubber Co. has transferred its racing tire headquarters to 4013 West Third Street, Dayton, Ohio.



Transfer Hose of KEL-F Elastomer handles red fuming nitric acid over long periods of time without deteriorating. **Protective Clothing** of elastomer-coated fabric shields workers from corrosive materials.

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Rubber is perhaps the most useful and versatile non-metallic material used by industry today. Its resilience and resistance to abrasion and breakdown make it an important tool in industrial techniques and plant equipment.

Yet in many applications—where the mechanical properties of rubber are vitally needed—extremely high-temperature and corrosive operating conditions rule out its use.

The development of KEL-F Fluorocarbon Elastomer fills a long felt need. Here is a high strength rubber that can operate effectively under conditions that swell, stretch and melt ordinary rubber.

Today, KEL-F Elastomer can be considered for those jobs once thought "impossible" for rubber. Just check its outstanding properties:

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KEL-F Elastomers have convincingly demonstrated their value in a variety of industrial roles: As *sealants* for corrosive liquids, abrasion and corrosion resistant *pump impellers* . . . heat and chemical resistant *hose, tubing, diaphragms, gaskets* . . . *transmission, brake* and *aircraft seals* . . . corrosion and flame resistant *protective clothing* . . . electrical and shock *insulation.*

This new elastomer is a result of Kellogg's comprehensive research in fluorocarbon chemistry. Its performance characteristics are well established in the chemical, electrical and equipment fields. If your work involves rubber at any point, then KEL-F Elastomer warrants investigation.

Our Technical Staff is prepared to work with you in adapting KEL-F Elastomer to your needs. For further information, write: The M. W. Kellogg Company, Chemical Manufacturing Division, P. O. Box 469, Jersey City 3, N. J.

THE M. W. KELLOGG COMPANY

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® KEL-F is the registered trademark of The M. W. Kellogg Company for its fluorocarbon products.

Borden Acquires Pioneer Latex

Domestic and foreign holdings of Pioneer Latex and Chemical Co., Middlesex, N. J., have been acquired by the Chemical Division of the Borden Co., New York, N. Y. Pioneer Latex, manufacturer of protective coatings and other products for the textile, flooring and adhesives industries, will be merged with Borden's Resinous-Reslac Department. The announcement climaxes negotiations begun last year. An undisclosed amount of Borden stock was exchanged for Pioneer's assets—a plant in Middlesex and an interest in Placco Puerto Rico and Placco Colombiana Ltda. Augustine R. Marusi, a vice-president of Borden and president of its Chemical Division, said the merged units will be known as Resinous-Reslac-Pioneer. "Products of the two are complementary", he said, "and this new move enables us to offer a more diversified line. It gives us a Resinous-Reslac plant in the New York area and this, with our contemplated expansion in the South and West, will round out geographical coverage; hence, better service to customers." Mr. Marusi said the Pioneer purchase is part of a five-year plan of general expansion for Borden Chemical. An "appreciable sum" has been set aside to enlarge production facilities at the Middlesex plant, he added. Borden Chemical now has 18 plants in the United States and an interest in 10 foreign operations.

Stephen G. Paliska, president of Pioneer since its inception, will become assistant general manager of the Resinous-Reslac Pioneer Department. Ashworth N. Stull of Borden's Peabody, Mass., plant, will continue as general manager. No personnel changes are contemplated. From a relatively small beginning in 1945, Pioneer has grown steadily and now lists more than 150 products. It is concerned primarily with the manufacture of asphalt solutions and emulsions, latex compounds, natural and synthetic rubber compositions. Physical properties at Middlesex include 20 acres of land and several one and two-story buildings. Resinous-Reslac products heretofore have included plastisols, organosols, rubber wax hot melts, vinyl and acrylic coatings, heat seal coatings, paper and foil laminates, resin emulsions and tackifiers.

General Bids For Carlon Products

General Tire & Rubber Co., Akron, Ohio, has made a bid for controlling interest in the Carlon Products Corp., Cleveland, Ohio, extruders of plastic pipe and tubes. Negotiations have begun with the American Research Development Corp. of Boston which owns 25% of Carlon's stock, Brigham Britton, president of Carlon, said. Most of the remaining stock is held by Mr. Britton's family. The plans became known when General Tire & Rubber filed a registration statement with the Securities & Exchange Commission for 26,068 shares of $5 cumulative preference stock with a $100 par value. The securities would be offered in exchange for common stock and 6% promissory notes of Carlon. Holders of Carlon's $1,060,000 notes and not less than 39,400 of the 68,837 shares have to accept the offer.

FINANCIAL BRIEFS

Graham-Paige Corp. reports that as of August 29 it had increased its holdings of Thermoid Co. common stock to 123,850 shares and that it had options to purchase an additional 144,538 shares. This would represent 32.1% of the 834,861 shares outstanding. Directors of Thermoid had refused on July 25 a request by Graham-Paige for representation on its board. At that time, Thermoid reported, Graham-Paige owned only 65,691 shares, with additional options for 184,697 and 18,000 shares.

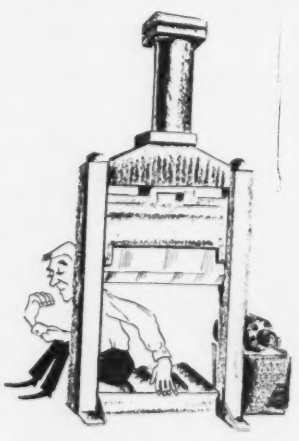
General Telephone Corp., direct and indirect beneficial holder of more than 10% of the common stock of the General Cable Corp., has exchanged 166,667 shares of its own common stock for 250,000 common shares of General Cable. General Telephone also acquired 125,000 shares of General Cable common through a transaction of a subsidiary, Lehigh Electric Co., leaving direct holdings of General Telephone at 250,000 shares and the holdings of its subsidiary at 125,000 shares.

David Rockefeller, director, in an original report, shows direct holding of 6,750 shares of common stock of the B. F. Goodrich Co., as of June 19, 1956.

American Smelting & Refining Co., direct beneficial owner of more than 10% of the capital stock of the General Cable Corp., has purchased 6,800 common shares, increasing its direct holdings to 936,318.

J. E. Trainer, executive vice-president of the Firestone Tire & Rubber Co., has bought 4,000 common shares, increasing direct holdings to 14,208.

Methyl acetate, used in biochemical and organic chemical synthesis, is now available in commercial quantities from the Polyco-Monomer Department Chemical Division, Borden Co., New York, N. Y.



"Man, dig that crazy nail clipper!"

Herbruck Retires From Wilson

The retirement of Karl P. Herbruck, vice-president and general manager of the Wilson Rubber Co. of Canton, Ohio, became effective September 1, climaxing 34 years of continuous service with the world's largest exclusive manufacturer of rubber gloves. Born in Akron, Mr. Herbruck was educated in the Canton public schools and received his mechanical engineering degree from Purdue University. He is a member of the Phi Kappa Sigma fraternity. Mr. Herbruck is widely known in the rubber industry, having been associated with the Firestone Tire & Rubber Co., Akron; McGraw Rubber Co., East Palestine, Ohio; Republic Rubber Co., Youngstown, Ohio, and through active membership in the Rubber Manufacturers Association and the Manufacturers Surgical Trade Association.

Shortly after the incorporation of the Wilson Rubber Co. in 1916, Mr. Herbruck joined the firm as treasurer and assistant general manager. In 1944, he was appointed vice-president and assistant general manager, and he continued in that office in the expansion reorganization of the firm as a division of Becton, Dickinson and Co., Rutherford, N. J. He has been a director of the Wilson firm for 30 years. Citing Mr. Herbruck's long record, F. S. Dickinson, Jr., president of Becton, Dickinson said, "His conscientious work and deep-rooted interest in the industry over the years contributed in a large measure to the top position and leadership earned by the Wilson Rubber Co. in this country and abroad." Mr. Herbruck will continue to serve as a director and consultant.

Shand Named Assistant Manager

The appointment of James E. Shand as assistant manager, chemical sales, has been announced by the Barrett Division, Allied Chemical & Dye Corp., New York, N. Y. Mr. Shand joined the firm in 1946 as a member of the technical sales service group, later serving as special representative. He was promoted to assistant sales manager in 1954 and named assistant to Leon W. Miller, manager, chemical sales, last March. Mr. Shand is a Tufts University graduate with a B.S. degree in chemistry. Prior to joining Barrett, he was with Ellis-Foster Co., Montclair, N. J., Lever Brothers, Cambridge, Mass., and Howe & French, East Weymouth, Mass., as a consulting research and development chemist.

Arnold Retirement Announced

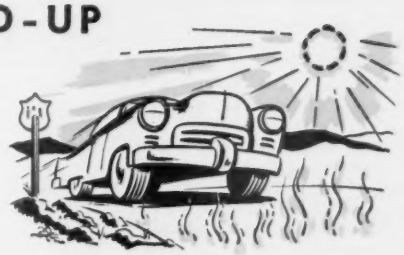
Phil Arnold, vice-president of the Garlock Packing Co., of Palmyra, N. Y., retired as an official of that company on July 1 after capably serving Garlock in a succession of sales capacities for 48 years. Starting in 1908 as a Garlock sales representative in a midwestern territory, Mr. Arnold was later made railroad sales manager, then Cleveland district sales manager and in 1929 vice-president in charge of sales. Early in 1950 he relinquished active direction of the company's sales activities, although remaining as a vice-president in a partially active capacity.

for less than 2¢ per tire

CIRCOSOL-2XH...

Helps Prevent HEAT BUILD-UP

Increased speeds have intensified the problem of heat build-up caused by flexure. By using Circosol-2XH® you get a more resilient rubber. This higher resiliency reduces hysteresis...lessens heat build-up...gives longer tire life.



Helps Eliminate TIRE SQUEAL

Squeal is a tread-design as well as a tread-compounding problem. The controlled balance of naphthenic and aromatic hydrocarbons in Sun's Circosol-2XH may answer your compounding problem...and...do it without sacrificing abrasion resistance or toughness.

Helps Make TIRES TOUGHER, SAFER

Circosol-2XH will give you tougher, more resilient rubber needed to make safer tires. Tests show that tires made with Circosol-2XH can take more impacts and a rougher all around beating than tires made with softeners of different composition.

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The cost of these extra advantages is low. Enough Circosol-2XH for an 8.00 x 15 size, 100 level tire costs less than 2¢ more than the cheapest softener you can buy. Get the full story on both the advantages and the low price of Circosol-2XH from your Sun representative. Or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. RA-9.

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West Coast News

Appointment of R. W. Maney as vice-president and general manager of the Goodyear Tire & Rubber Co. of California has been announced by E. J. Thomas, Goodyear president. For the past year, Mr. Maney has been general manager of the California company. In his new post he heads up all Goodyear operations in the Western Division area comprising 10 western states. He succeeds the late Dent W. Sanford as vice-president. Mr. Maney joined the company in 1929 after graduating from the University of Kansas. After serving a widespread apprenticeship in both sales and production, Mr. Maney's advancement has been steady and rapid.

In 1940 he was named assistant to the superintendent of Goodyear's Plant 1 in Akron. The next year he was made superintendent of the plant. After an assignment as factory personnel manager in 1942, Mr. Maney was transferred to the company's Gadsden, Ala. plant as general superintendent. Returned to the Akron factory in 1944 as superintendent of Plants 1 and 2, he was appointed manager of the Los Angeles plant in 1950.

Stillman Rubber Co., Culver City, Calif., has completed construction of an 8,000 square foot, two-story office and warehouse building at 5811 Marilyn Avenue, Culver City, alongside the existing plant. The new building is part of an extended expansion program that will increase production capacity by 30%, C. T. Erickson, executive vice-president, announced. Administrative, accounting and sales offices in the upper story of the concrete block building are already being readied for occupancy. The ground floor will be used for a warehouse storage area. Stillman did its own contracting and construction on the building and prepared architectural specifications.

Robert F. Connelly has been assigned as the West Coast field salesman for the Organic Chemical Sales Department of Emery Industries, Inc. Mr. Connelly will be responsible for sales of all organic chemicals including plasticizers, dibasic acids, synthetic lubricant bases, textile chemicals, soluble oil bases, and special derivatives. Mr. Connelly holds a B.S. degree in organic chemistry from the California Institute of Technology. Prior to his joining Emery, he was associated with the Bray Oil Co. in a research and development capacity, and the Shell Oil Co.

As an indication of the growing popularity of its machine-molded flexible radiator hose, the W. J. Voit Rubber Corp. has announced the addition of four new sizes to its line in order to maintain complete automotive coverage. The machine-molded line, designed specifically to meet the demands of today's modern and efficient power plants, made its first appearance a year ago. One of the chief reasons for the hose's popularity has been the all-neoprene construction, the company states. Voit also employs a special Hypalon coating inside and outside the hose to assure against aging and weather checking.

Chester T. Morledge has been appointed general manager, Special Brand Sales of the B. F. Goodrich Tire Co. Mr. Morledge, born in Akron, Ohio, is a graduate of Heidelberg College, Tiffin, Ohio. He has been with Goodrich since June, 1936 and was vice-president in charge of sales for the India Tire Company before joining B. F. Goodrich.

Arthur B. Bush and Richard A. Lord have been appointed to new assignments in the Sundries Department, B. F. Goodrich Industrial Products Co. Mr. Bush has been named manager of the department and Mr. Lord has been appointed field sales manager.

Shown below is the new plant of the Atlas Sponge Rubber Co. at 1707 S. California Avenue, Monrovia, Calif. It will be remembered that the company's previous plant was destroyed by fire some months ago. The new 8,000 square foot building is of concrete tilt-up construction and is fully sprinklered. The new location provides adequate parking, receiving and shipping facilities, the company states. Atlas Sponge Rubber specializes in the contract manufacture of chemically blown sponge rubber products from all types of polymers.

Shown here is the new plant of the Atlas Sponge Rubber Co. at Monrovia.

R. W. Maney

newly appointed vice-president and general manager of Goodyear-California.

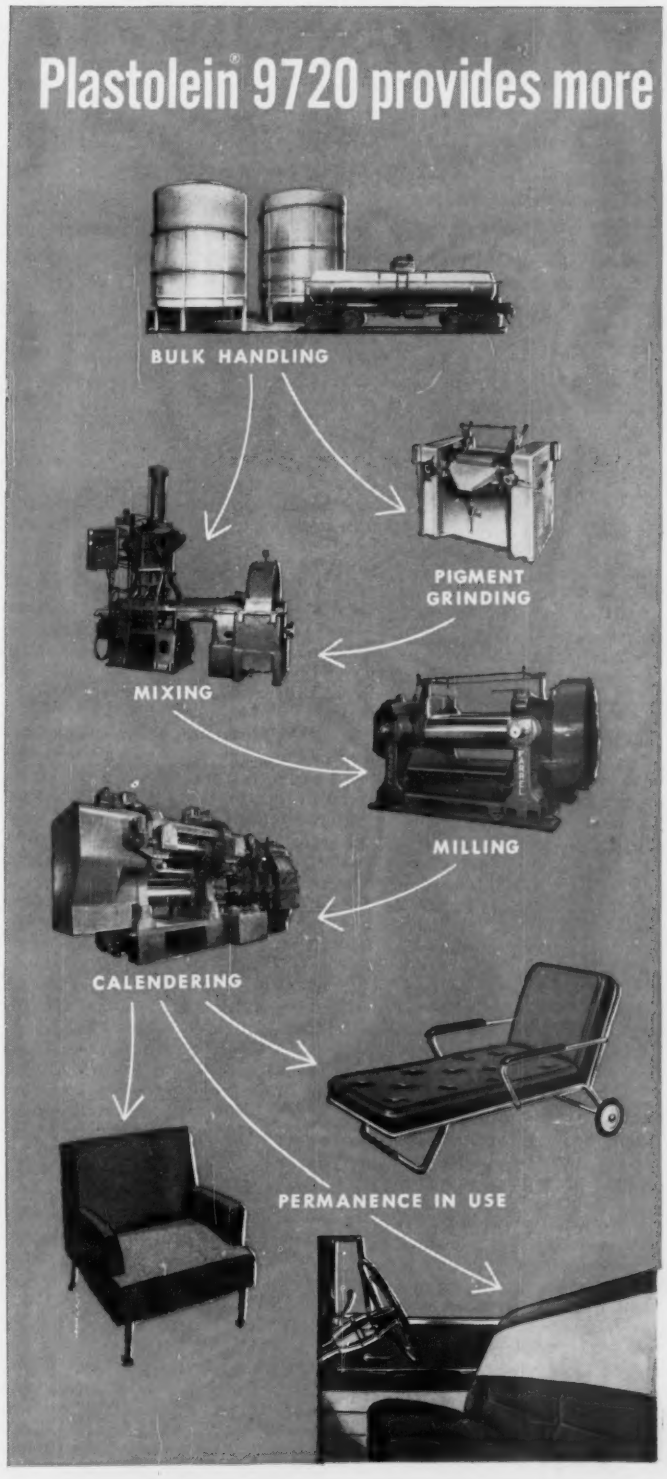
To Represent Aquadyne Corp.

Whittaker, Clark & Daniels, Inc., New York, N. Y., have extended their line to include products for making 'wet water." Whittaker will represent the Aquadyne Corp. of Clark, N. J. as distributor for "Aquadyne" and "Hydrodyne." These are highly concentrated, multiphase wetting agents designed for specialized industrial uses. Aquadyne is compounded in solid capsule form for use in a proportioning device, the Hydroblender, which is conveniently installed wherever water is available, and where the Hydroblender can be reloaded with capsules, to provide on-the-spot generation of wet water. Hydrodyne, a liquid concentrate available in one, five and fifty-five gallon containers, can be proportioned as required, by hand or by liquid proportioning devices. Whittaker will distribute these products to the rubber and other industries where effective wetting agents are used extensively in the manufacturing process.

Copies Of Patents Available

Microfilm copies of 1,650 patents and 3,200 patent summary cards on the development of synthetic rubber in the United States and Europe have been made available to science and industry by the Office of Technical Services, U. S. Department of Commerce, Washington, D. C. The collection, which was microfilmed in 1948, contains practically all patents produced during World War II and earlier by Germany, Britain and France. Included also are some basic Austrian patents and a number of U. S. developments of special interest. The summary cards are abstracts of the more significant French and British patents. Sets of microfilms, with five reels to a set, may be ordered from Photoduplication Service, Publications Board Project, Library of Congress, Washington 25, D. C. (order PB 120575; price, $20 per set).

Plastolein® 9720 provides more measurable advantages



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IN PERMANENCE

Here's how Plastolein 9720 Polymeric can help you make a better vinyl with more sales appeal —at lower cost!

PROCESSING: The outstanding processing ability of 9720 makes possible savings all along the line.

Bulk Handling: A low viscosity fluid, 9720 can be shipped in tankcars, stored in bulk, and piped to point of use at substantial savings over drum units.

Pigment Grinding: An excellent grinding vehicle, Plastolein 9720 produces uniform dispersions possessing unusually low-viscosity for easier handling.

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Calendering: Stocks containing 9720 process easier, faster and require minimum attention. Air entrapment and coldstreaks are minimized.

PERMANENCE: Useful life of finished sheeting, film and coated fabrics is increased 3 to 4 times over monomeric formulations.

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Canadian News

A $400,000 addition to the B. F. Goodrich Canada, Ltd., plant has been announced by M. G. Morgan, vice-president, manufacturing. Located at Kitchener, Ont., the new structure will house expanded roll covering and tank lining departments and will add 10,000 square feet of floor space to the present departments. Work on the new addition is expected to be completed early in 1957 and the new building will double the present output of rubber lined tanks and rubber covered rolls.

The new addition will permit handling of 30 ton rolls, the largest projected for use in Canada. Tanks and rolls are lined with rubber for protection against acids and corrosive chemicals. The key to lining tanks and covering metal products lies in what Goodrich engineers call the Vulcalock process. By means of this exclusive process, soft elastic or hard rubber can be applied directly to metal. Paper mill rolls, steel mill rolls, storage tanks, pickling tanks, pipes, fittings, fans, pumps, valves, electroplating tanks, fume ducts and sewers are among the many products handled by the Vulcalock process.

The addition will provide working space for about 100 highly-skilled employees. Some of these men will be returning shortly from the million dollar tank lining now being completed by Goodrich for Algom Uranium Mines at Quirke and Nordic Lakes. This was the largest tank lining contract ever handled in North America.

The new building is in addition to the $3,500,000 internal expansion program which has been carried on at Goodrich over the past two years. Installation of new equipment and additional machinery is now largely completed and has boosted production at the plant by nearly 30%.

Goodrich also recently announced the start of construction of a $3,500,000 chemical plant at Welland. The capital expenditures on major projects which have been authorized by the company within the past two and a half years now total $7,500,000.

Three Kitchener, Ont., rubber footwear industrialists have welcomed the word from Ottawa that the government will examine the reported threat to the century-old industry's existence through a surge of low-priced imports. Announcement of the probe was recently made to the House of Commons by Canadian Trade Minister C. D. Howe. Ira G. Needles, president of B. F. Goodrich Canada, Ltd., said "the news that the government is recognizing the industry's plight is a bright spot in an otherwise bleak picture".

A year ago, the import of rubber-soled canvas shoes accounted for 52.9% of the total Canadian demand, explained Mr. Needles. They now have spiralled to 62.2%. A. R. Kaufman, president of Kaufman Rubber Co., Ltd., and A. W. Hopton, vice-president of Dominion Rubber Co., Ltd., joined Mr. Needles in saying the same trend is taking place in the waterproof footwear business. Mr. Needles went on to say that imports of this type now account for 11.6% of the Canadian rubber footwear market. "This situation shows no sign of reversing itself and employment in the Canadian industry has steadily and rapidly decreased," he said. Within five years the rubber footwear industry will be dead if the current trend continues, many in the trade contend.

"The situation is desperate," said another spokesman. "Imports from the East and particularly from Hong Kong are killing us. It's worst in the running shoe type of footwear but is getting bad in the waterproof lines, too."

A lower selling price has been the big factor in the rapid rise of imports. Last year, the six Canadian firms in the business turned out 2,000,000 pairs of shoes with a value of $4,000,000, or about $2.00 a pair. Imports totaled 2,500,000 pairs with a total value of $1,300,000, about 52 cents a pair. The Canadian industry, however, had a heavy inventory carry-over into this year.

"We can't compete with that," a manufacturer said. "Those people pay about six cents an hour in wages compared with the average in Canadian rubber industries of $1.40. Also, when they use their own ships they can lay shoes down anywhere in Canada for five cents a pair transportation costs." In the waterproof footwear line, there were only 91,000 pairs of waterproof products imported in 1949 and last year the trade reports imports were 1,151,000 pairs.

Already, one firm, Goodrich, has pulled out of the field and the remainder have trimmed the number of their employes from 7,200 in 1947 to 4,850 in 1955—a drop of 46%. In applying to Ottawa for help, the industry asked quotas for imports of canvas-rubber shoes and waterproof footwear, and a tariff to bring selling prices more in line.

Final agreement is said to have been reached between five land owners in the Red Deer district near Edmonton and an unnamed large corporation for the purchase of 1,580 acres of land, presumably for a synthetic rubber plant. It is reported that an option, handled through the Montreal Trust Co. in Calgary, has been taken up at varying prices. The property will be taken over at the end of the year. Prices ranged from $125 per acre to $50 per acre.

It is believed this site, which lies along the north bank of the Red Deer river, eight miles northeast of Red Deer, will be used for a rubber plant, probably built by the Polymer Corp. Some of the land is cultivated and the rest is rugged pasture or riverbank land. A branch line of the CNR winds through the area near the river and the location is four miles east of No. 2 highway at Blackfalds.

The appointment of M. F. Fitzgerald as vice-president and general manager has been announced by B. F. Goodrich Sponge Products Canada, Ltd. Formerly plant manager, Mr. Fitzgerald has been with the company since its inception in 1951. Appointed as plant manager is H. V. McMurray, formerly sales and advertising manager. Mr. McMurray will retain the position of advertising manager. B. F. Goodrich Sponge Products Canada, Ltd., manufactures a complete line of sponge rubber and foam rubber products as well as specialized plastic foam products.

Goodyear Tire & Rubber Co. of Canada, Ltd., Montreal, has reported that dollar sales so far this year are almost 10% ahead of last year, and this gain is being reflected in a higher net. For 1955, the company reported a net of $4,397,496, equal to $15.95 a share, nearly double the $2,476,961 or $8.48 a share of 1954. R. C. Berkinshaw, president and general manager, adds that the outlook is for sales to maintain their present level for the rest of 1956, and he describes the demand for truck tires in particular as being unusually high. While sales in original equipment—tires for new cars—are slightly down, largely as a result of the labor strike at General Motors of Canada last winter, they are now catching up, and the deficit is in any case more than balanced by new tire replacement sales to dealers.

Mr. Berkinshaw sees original equipment demand being well maintained in the future and looks to the time when the per capita count of autos in Canada will equal that in the United States. Goodyear's new captive air safety tire is expected to go into production soon at the Canadian company. The company's industrial rubber products also are showing sharp sales increases, mirroring the high tempo in Canada of industrial activity.

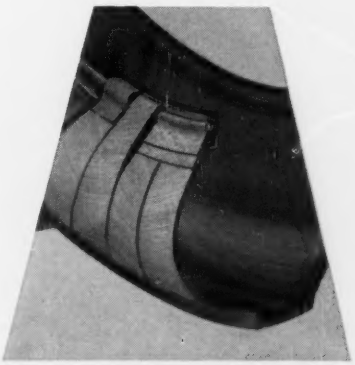
Three of Canada's largest electric wire and cable operators have announced plans for major expansions. They are Canada Wire & Cable, who will build an enameled wire plant at Simcoe, Ont.; Pirelli Cables, Conduits, Ltd., who plans a copper rolling mill to feed its new $2,000,000 cable plant at St. Johns, Que., and Phillips of Brockville. The latter will add a $5,000,000 expansion to the $3,000,000 program completed last year. The wire and cable industry's sales for 1956 should be above 1955, when they rose 17% over 1954 and reached $144,000,000-plus. So far the industry has been getting orders at a rate 10% above last year. Deliveries are now running on a 3 to 5 month basis.

General Latex & Chemical Corp., Cambridge, Mass., plans to open its second plant in Canada at Brampton, Ont., on October 1, 1956. The new plant of 16,000 square feet will be known as General Latex & Chemicals (Canada) Ltd., and will contain fully integrated facilities for latex compounding and distribution, and a complete laboratory. It will be located on a railroad siding and is being erected for the purpose of better serving the rapidly expanding market in the Toronto area. The plant superintendent will be Clayton Sturgeon, and Ronnie Perego will be the chemist in charge.

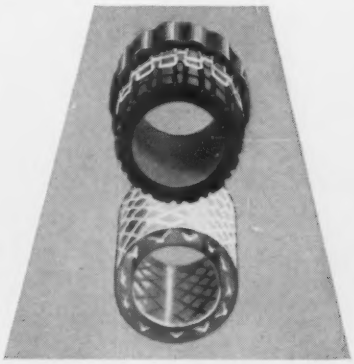
Wider range of high-strength yarns and fibers than any other brand

American Viscose Corporation, the nation's largest producer of rayon, manufactures a wider range of high-strength yarns and fibers than any other company.

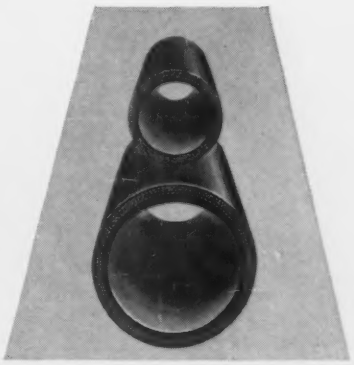
Here are a few of the hundreds of applications of AVISCO rayon that make industrial products stronger, more versatile, longer lasting:



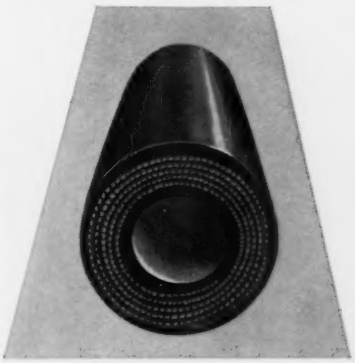
Rayon chafer fabric woven from continuous filament Rayflex yarn or high-strength Viscose 32-A staple yarns.



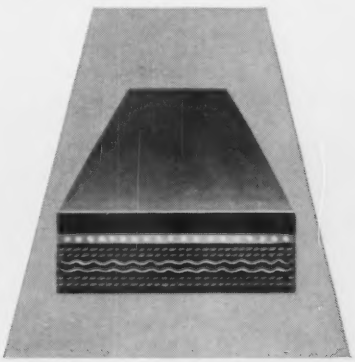
Garden hose—rubber or plastic—reinforced with either knit or braided rayon tire yarn for high strength, durability.



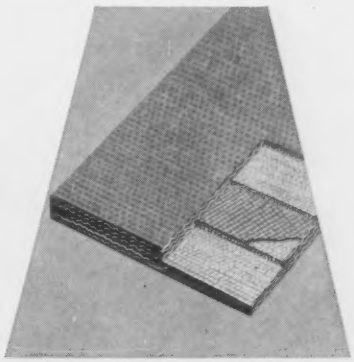
Automobile heater and radiator hose reinforced with knitted high-strength tire yarn.



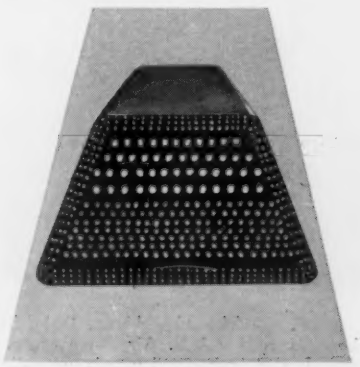
Spiral-wrapped hose made from fabric woven from Viscose 32-A high-strength staple. Wide range of uses wherever high bursting strength is required.



Conveyor belt reinforced with Super Rayflex rayon in cord or duck construction. Also made with fabric of Viscose 32-A high-strength rayon staple.



Heavy-duty power transmission belt with multiple plies of Super Rayflex for maximum strength and high operating efficiency.



V-belt, constructed of layers of tire fabric or individual cords.

We would be happy to discuss with you how you can use AVISCO rayon to strengthen your business.

American Viscose Corporation
350 Fifth Avenue
New York 1, N. Y.

AVISCO *is the trademark of American Viscose Corporation*

Obituaries

Thomas F. Callahan

Thomas F. Callahan, who had been associated with the Witco Chemical Co. and its predecessor, the Wishnick-Tumpeer Co., from 1937 to 1955, died on August 24 at his home in Akron, Ohio. He was 49 years old. Born in Akron, Mr. Callahan was graduated from the Catholic University of America in 1932 with a degree in chemical engineering. During his undergraduate days, Mr. Callahan was a member of the varsity football and boxing teams, a member of the Monogram Club and president of the Student Athletic Association. Mr. Callahan's first contact with the rubber industry was made in the physical testing laboratories of the B. F. Goodrich Co. where he was employed for four years after graduating from high school in 1924. After graduating from Catholic University, he joined the laboratories of the Palmer Carbon Co. of Borger, Texas, and stayed with the firm until it went out of business in 1937. At that time, he joined Wishnick-Tumpeer in New York. He worked in the New York and eastern seaboard areas until 1954 when he was transferred to the Cleveland office. He left Witco's employ in 1955. During World War II, Mr. Callahan served for four years in the U. S. Navy and held a lieutenant's commission. He was a member of the American Chemical Society and had been active in the New York Rubber Group for many years. A requiem mass was held on August 27 in St. Vincent's Church in Akron, with interment in Holy Cross cemetery.

Dent W. Sanford

Dent W. Sanford, vice-president of the Goodyear Tire & Rubber Co. of California, died August 6 in Los Angeles. His age was 65. Mr. Sanford joined the Goodyear Tire & Rubber Co. as a general line salesman in 1915 at El Paso, Tex. From there he rose through the ranks to direction of the company's western subsidiary. After two years as a salesman in El Paso, Mr. Sanford successively was named district sales manager in Phoenix, Salt Lake City, San Francisco, El Paso, Portland and Los Angeles. In 1931, he became manager of the Southern Sales Division and a year later was appointed assistant sales manager of the Tire Sales Department in Akron. He served as manager of the Northeast Division until 1944, when he was named vice-president.

A 98-mile plastic pipe line, made of Kralastic, has been installed in a drought-hit section of west Texas near Dimmitt to carry fuel to 200 irrigation pumps.

Harwick Standard Chemical, 60 S. Seiberling Street, Akron, Ohio, has published three bulletins summarizing the Thixons (#03-1-5-5-56), Plasticizer SC (#06-72-3-5-56) and Lubri-Flo (#11-124-2-5-56).

Lawrence H. Chenoweth

Lawrence H. "Larry" Chenoweth, retired sales executive of the B. F. Goodrich Industrial Products Co. died on August 7 after a long illness in Good Samaritan Hospital, West Palm Beach, Fla. He was 65 years old. A native of Chicago, he was with Goodrich for 37 years. He joined the company in 1914 immediately after his graduation from Harvard University. When he retired in 1951, he moved to Florida. Mr. Chenoweth was manager of a Goodrich store in Norfolk, Va. in 1916 and the following year he was chief clerk in industrial products sales in Chicago. He became a sales representative in Kansas City in 1919. Goodrich transferred him to Akron in industrial products sales in 1923. After serving as manager of the company's Detroit district, Mr. Chenoweth returned to Akron in 1931 as assistant manager of industrial products sales. In 1939 he became assistant merchandising manager of the division and then merchandising manager. Mr. Chenoweth was the first general manager of the company's Plastic Materials Sales Division. In 1942, Mr. Chenoweth was granted a leave of absence from Goodrich to serve in the Rubber Products Division of the War Production Board. Before his retirement he was a member of the Portage Country Club and the University Club. He was past-president of the Harvard Club of Akron. Mr. Chenoweth leaves his wife, two daughters, and a son.

Alva F. Myers

Alva F. Myers, senior assistant treasurer of the U. S. Rubber Co., died of a heart attack on August 14 in the White Plains Hospital, White Plains, N. Y. He was 62 years old. Mr. Myers was born in Brooklyn, N. Y. on July 15, 1894 and was graduated from Pace College. He joined U. S. Rubber in 1920 as an accountant and served with the company for 36 years in its headquarters in New York City. He became an assistant treasurer of the company in 1929 and was named senior assistant treasurer in January, 1956.

Leo M. Smith

Leo M. Smith, assistant superintendent of the Hose Department, Goodyear Tire & Rubber Co., Akron, Ohio, died August 1 at his home in Akron. His age was 58. Mr. Smith had been with Goodyear 42 years. He joined the company as a stenographer. In 1924, he was assigned to the superintendent's office and four years later became night superintendent. Mr. Smith was promoted to the position of Hose Department foreman in 1927 and to division foreman of fire hose in 1934. He became head of all hose production in 1948.

Dr. Pierro Pirelli

Dr. Pierro Pirelli, chairman of the board of Pirelli S.p.A., died of a heart attack on August 7 at his home in Milan, Italy. Pierro Pirelli was born in Milan on January 27, 1881, the first son of Senator Giovanni Battista Pirelli, who established the business that grew into the company as it is known today. After pursuing technical and economic courses in Milan and law courses at Genoa, Mr. Pirelli took his law degree in 1903. In that same year, he and his brother, Dr. Alberto Pirelli, entered the Pirelli company. For fifty years the two brothers shared an office, each participating and sharing in the problems of the other. In 1921, Pierro Pirelli became managing director of the Pirelli organization and in 1932, at the death of his father, he became chairman of the board and president of the company. He retained his presidency until 1945 from which date he continued as chairman of the board.

During more than 50 years of work, Dr. Pirelli took an active part in Italy's economic and industrial life. He was a director of the Italian Chamber of Commerce, president of the Rotary Club, director of various industrial and financial corporations, and a former vice-president of the Confederation of Italian Industries. He was also an active force in the mechanization of Italian agriculture and redeemed thousands of acres of swamp and pasture land for intensive agricultural production. In his own firm, he was responsible for innumerable workers benefits and contributed greatly to the development of the Pirelli organization at home and abroad. He is survived by his brother, Dr. Alberto Pirelli, and a sister.

Ernest F. Gates

Ernest F. Gates, manager of accessories and repair materials sales at the Seiberling Rubber Co. for the past five years, died at Akron City Hospital on August 27 after a brief illness. He was 53 years old. Mr. Gates joined Seiberling in 1945 as a service representative for the company's tire retread program. He moved to the Accessories and Repair Materials Sales Department in 1947 and became manager in 1951. Prior to joining Sieberling, he was associated with Goodrich, Martin Tire, and Goodyear. He was graduated from Ohio State University. Mr. Gates is survived by his wife.

Pittsburgh Coke & Chemical Co., Pittsburgh, Penna., and the Oronite Chemical Co., San Francisco, Calif., were presented with the Lammot du Pont Safety awards at the annual meeting of the Manufacturing Chemists' Association.

B. F. Goodrich Co., Akron, Ohio, has been awarded a U.S. Air Force contract for aircraft brakes and wheels amounting to $1,620,000. The order calls for 1100 wheels and 3980 brakes for fighter aircraft.

For high tensile strength and tear resistance

REINFORCE WITH CUMAR* RESINS

Tire treads, reclaims, tube stocks, extrusions—hundreds of rubber products are benefiting from the remarkable reinforcing properties of "CUMAR" Resins. These paracoumarone-indene resins bolster the physical properties of GR-S and most other natural and synthetic polymers. And they add an attractive sheen to finished rubber articles.

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If it's reinforcement you want—or an economical softener that permits high loading—try "CUMAR" Resins, already widely used throughout the industry. Your Barrett representative will see that you get samples and technical assistance. Or call us direct for assistance.

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It pumps latex and latex effluent without shear or turbulence.

Ejectopump needs practically no maintenance. Has no rotating or reciprocating parts, no bearings, no packing. Needs no lubrication. Quickly disassembled for cleaning.

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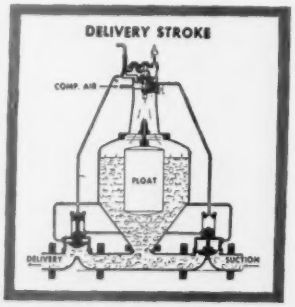
Connect to compressed air line 30 to 50 psi. Handles discharge heads up to 100 ft., with maximum suction 20 ft. Pump is self-priming, may be installed above level of liquid pumped. Can be furnished in special alloys for pumping corrosives. Sizes: 1½", 2", 3", 4", 6".

WRITE TODAY for complete information and prices.



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Supplies Division
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Overseas

London—The Soviet Union may be running into a temporary shortage of sterling and for this reason may be delaying orders for September and October rubber shipments from London. Bullion dealers in London advise that there have been no sales of Soviet gold recently. Some times in the past, when the Soviet has been short of sterling, she has sold gold on the London bullion market.

—•—

Colombo—Ceylon has abandoned the idea of sending a delegation to China to negotiate prices for next year under the rubber-rice pact with that country. Instead, the government proposes to invite a delegation to visit Ceylon in November. All negotiations under the pact have so far been conducted in Peking.

—•—

Duesseldorf—The new synthetic rubber plant of the Buna-Werks Huels Co. is expected to start production at a rate of 45,000 tons annually early in the summer of 1958. The new plant will turn out "Buna Huels K", a cold rubber with properties largely corresponding to those of natural rubber.

—•—

Kuala Lumpur—The Associated Chinese Chambers of Commerce announce that they have received an inquiry from a big South African manufacturer for 50,000 tons of brown crepe and smoked sheet for delivery between September and December. This is said to be the largest quantity of rubber any single manufacturer has asked to buy from Malaya.

—•—

New Delhi—The Indian Government has decided to import several grades of raw rubber with licenses granted to users on an ad hoc basis. The grades include crepe rubber (other than sole crepe), sheet rubber and latex. Also to be imported are synthetic rubber, reclaimed rubber and scrap.

—•—

London—The Monopolies and Restrictive Practices Commission has recommended that members of the Rubber Footwear Manufacturers' Association should cease to consult one another about the prices of either rubber boots or canvas footwear, and should be free to negotiate special prices with traders for large orders without notifying each other.

With this issue, RUBBER AGE initiates a new method of presenting foreign news developments under the heading "Overseas." While we have always paid full attention to foreign news, we have now undertaken, through the exclusive services of the Reuter's News Agency, to considerably expand this coverage as an added service to our readers. Through the world-wide facilities of the Reuter organization, we will be able to add a new dimension to the reporting of news vital to the rubber industry. Foreign items of interest will continue to appear in our regular news columns as well as in the "Overseas" columns.

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The FLASK and FLAME
SPREADS its WINGS

to provide the FASTEST technical service for Midwest Cities

When a C. P. Hall Company customer needs technical assistance, he knows he can depend on getting it FAST. Here's Jimmy Dunn, one of The C. P. Hall Company's midwestern representatives, getting ready to take off in his plane. With this private plane, private cars, and regular airlines, representatives of The C. P. Hall Company travel nearly a million miles a year . . . to provide YOU with the kind of service that has made The C. P. Hall Company one of the leaders in the rubber chemical field.

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Curing Agents
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Plasticizers
Low Temperature Plasticizers
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Solvents
Oxides
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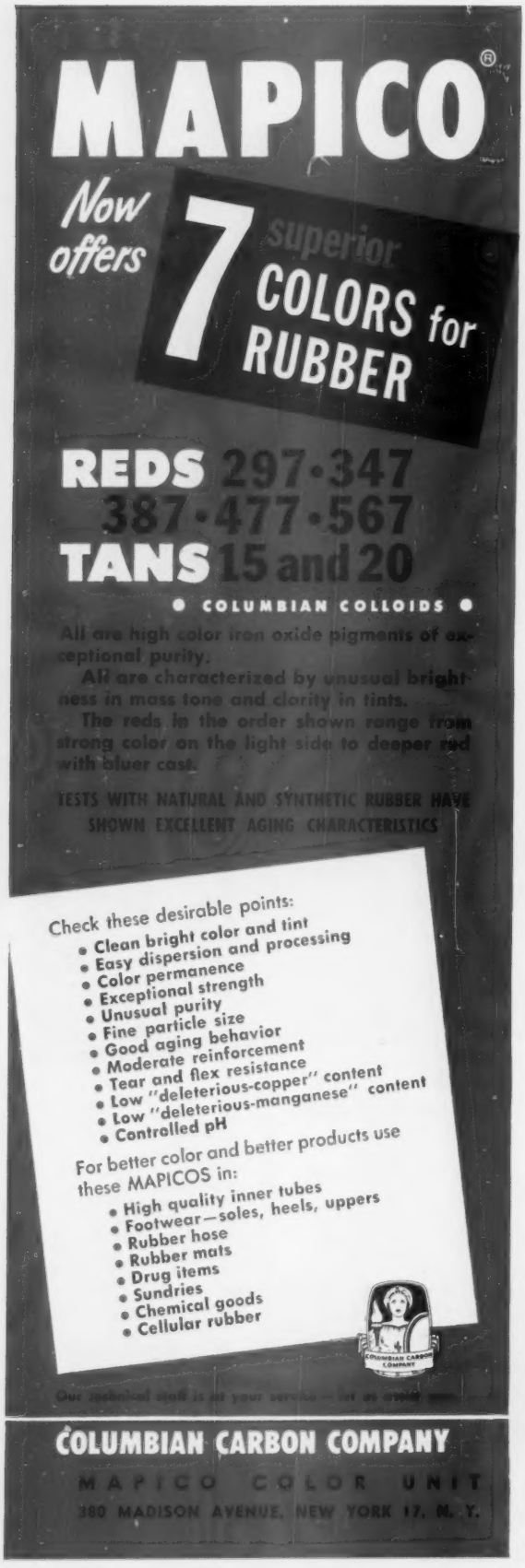
CHEMICAL MANUFACTURERS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All are high color iron oxide pigments of exceptional purity.
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OVERSEAS (CONT'D)

Singapore—Market sources here view the Suez Canal situation as a possible threat to communications between the rubber growing areas of Southeast Asia and the consuming areas of Europe and the United States. Managers of the big shipping firms in Singapore say they have not yet received any instructions to re-route ships or cargo.

—•—

Istanbul—Turkish authorities have released $1,000,000 in foreign exchange for the import of passenger car and truck tires from Italy.

—•—

Amsterdam—The Amsterdam Rubber Co. has no present intention to begin the manufacture of synthetic rubber, shareholders were told recently. Huge investments would be required to do so and the board said it considered the manufacture of synthetic rubber a task for the oil industry.

—•—

Singapore—Communist China has intimated that she will resume buying Malayan rubber, with an initial purchase of 10,000 tons. It is expected that the initial purchase will be spread over a 10-month period. Local traders predict that the Chinese purchase will have little effect on the market.

—•—

Milan—Pirelli has called for *voluntary resignations* at a number of plants in this city. The firm says the idea is to cut down overstaffing without mass dismissals. Pirelli offers those who leave a 50% increase on the usual compensation for dismissal plus payment for between 500 and 1,000 working hours. The company's move is said to be a result of the present crisis in the Italian rubber industry in which tire sales have fallen more than 50%.

—•—

Kuala Lumpur—Japanese traders will buy 80,000 tons of rubber from Malaya next year, according to current reports. An unofficial Federation of Malaya delegation made this estimate as it invited Japanese rubber traders to visit Malaya.

—•—

Amsterdam—The growing depreciation of the Indonesian rupiah is causing major concern to plantation companies with headquarters in this city. This situation cannot possibly continue, spokesmen say, without gravely damaging Indonesian exports. On the other hand, the lowering of rubber export duties and the increase of export premiums in Indonesia are indications that the authorities have a clear understanding of the difficulties.

—•—

Singapore—The head of the Labor Front coalition goverment will demand that Great Britain open talks on "full internal self-government" for the colony by next April. Talks on this problem collapsed last May. At that time, an all-party delegation failed to reach agreement with the British Government over control of the colony's security forces.

—•—

Hong Kong—The leader of a Singapore trade delegation to Japan and China observes that China could prove a "huge" market for Malayan rubber. But first, he said, the mission will have to convince Chinese buyers of the quality and grading of the rubber.

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Sales are lost, product acceptance damaged, when ozone cracking shows up even on new products.

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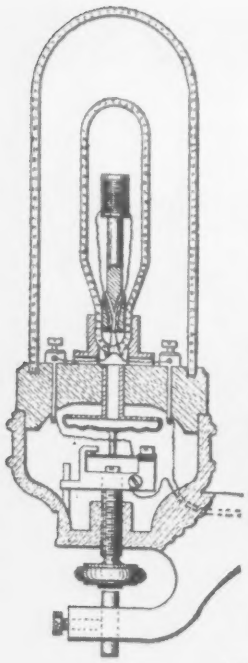

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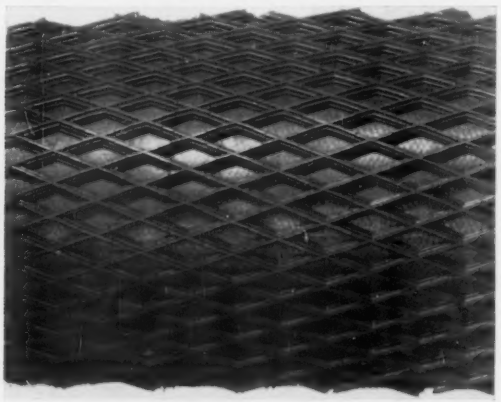
Wedge-Grip Package Conveyor

A "three-deck" package belt conveyor, the "Wedge-Grip," having a three-stage designed belt cover that gives it gripping power to handle all types of packages from cans to rough cloth bags on inclines ranging from 30 to 35 degrees, has been added to the line of the Goodyear Tire & Rubber Co., Akron, Ohio. Certain types of smooth, hard packages can also be carried by the new belt on inclines up to 45 degrees. Criss-cross-



ing ribs form small, open-center diamonds on the surface of the belt. The ribs are constructed with a "step-down" design, so that as each step in the ribs wears down, a new rib is presented for use. This design also makes the top and second ribs more stable because of their broader supporting bases, the company reports. The cross-angle rib design is sliced at regular intervals to provide individual gripping "fingers" which adjust themselves to uneven surfaces. Constructed of soft abrasion-resistant rubber compound, the Wedge-Grip belt is being manufactured in square edge slabs and cut to widths up to 60 inches with edges coated black.

Industrial Electric Blanket

Thin, rubber electric blankets, manufactured by the U. S. Rubber Co., 1230 Avenue of the Americas, New York 20, N. Y., are now being used in industry wherever heat must be applied in limited areas. The "Us-kon" blanket consists of a paper-thin layer of rubber, which is treated to conduct electricity, between two sheets of non-conductive neoprene rubber. The resulting flexible blanket can be produced in any size and is plugged in an outlet like an electrical appliance. Although on the market for less than a year, the item is used for applications such as drying glue, laminating materials through heat, pre-heating plastics, liquefying solids, speeding chemical reactions, melting ice in refrigerator cars and heating cargoes.

The blanket, which can be bent around corners, stuck into crevices, used as a wrapping and nailed or stapled along edges, will stand up to 200 pounds of pressure a square inch, the company reports. The length of life of the blankets depends on the heat produced. At 150°F., they will last about 20,000 hours and at 175°F., the life expectancy is 6,500 hours.

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Because Polysar's quality, uniformity and customer service enable you to raise product standards and cut production costs. From a wide variety of Polysar types, you can choose the one best suited to your technical needs.

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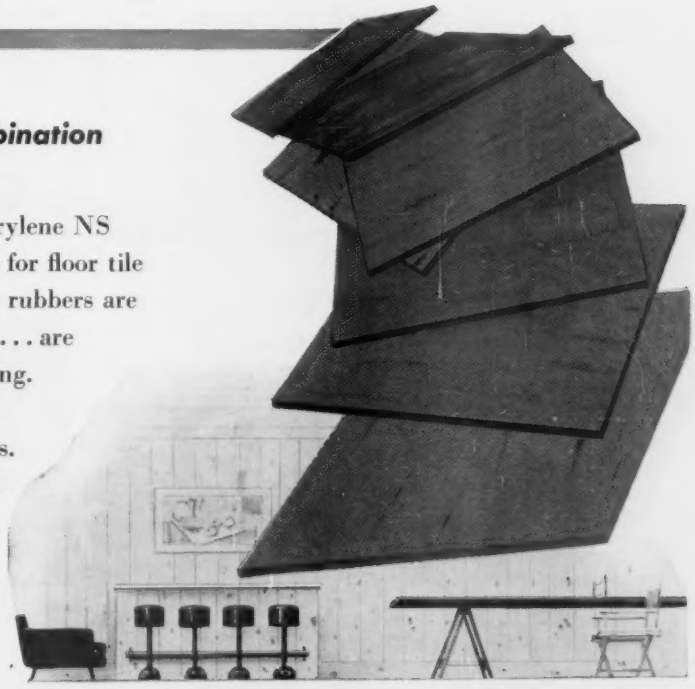

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Here at last is the answer to your problems of dicing rubber or vinyl sheet stock. Produces perfect cubes ranging in size from ⅛ to ½" by merely changing knives.

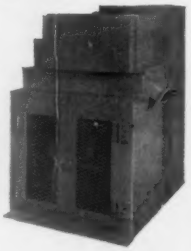
Comes in two sizes designed to handle sheets up to 7" or 14" in width. Other sizes made to order.

Input speeds range from 10 to 125 feet per min. depending on material and size of cube desired.

The CUMBERLAND Rotary Chopping and Dicing Machine

As a chopper, this machine efficiently cuts rubber and vinyl slabs into small pieces. Two sizes available to handle stock widths up to 14 or 24 inches.

As a dicer in modified form, handles principally vinyl sheet stock. A less expensive machine though less universal than the "Stair-Step" Dicer shown above.



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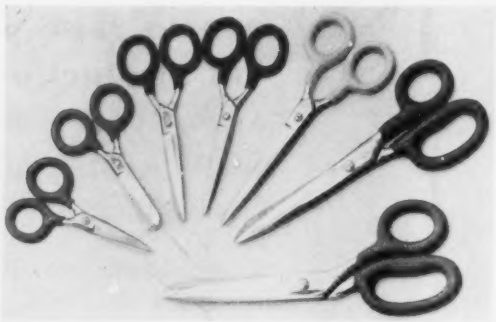
Builders of Better Machines for the Rubber and Plastics Industry

Plastisol Scissor Grip

A comfortable grip, which is claimed to eliminate "finger fatigue" and ease difficult cutting jobs, is the outstanding feature of a new line of scissors and shears offered by John Ahlbin & Sons, Inc., 188 Garden Street, Bridgeport 5, Conn. A cushioning effect is produced by coating the handles with a foamed plastisol based on Bakelite vinyl resins. Soft and resilient to the touch



but not slippery, this coating adheres firmly to the forged steel. The new line includes blunt scissors, sewing scissors, straight shears and bent shears in a variety of sizes from five inches to eight inches long. The plastisol coating is available in blue, yellow, green and red. Since the color is dispersed throughout the foam, it will not wear off with use, the company reports. According to the manufacturer, the rings of the new scissors and shears are not rough on the fingers even when used for lengthy cutting jobs.

"Mity Mac's" Car-Top Carrier

A new car-top carrier, called "Mity Mac's," having two strong magnets molded into a neoprene sponge rubber block is being manufactured by the Magnetic Products Corp., 13025 Halldale Street, Gardena, Calif. The magnets will not wear out, the company claims,

and they stay in place over rough roads and at high speeds. The manufacturer reports that in road tests up to 100 miles an hour, a bundle of fishing rods did not budge, even when mounted crossways on the car. The carrier can be removed if desired by rolling back the sponge. The sponge block resists skidding and is arched in the middle to cushion the load on bad bounces. Tie-down cords can be replaced if they get frayed or cut.

Making Customers Feel Like This Is Our Business

Something new every day in the rubber business. But juggling your formulations with new materials doesn't have to make you feel glum. Monsanto's Rubber Service Department at Akron keeps tab on *every new material* that comes out; is ready to assist you with up-to-the-minute data to guide your formulations. Take the job of producing a good heat-resistant butyl insulation stock:

The Problem: Produce a high-voltage butyl insulation stock.

Here's What Monsanto Compounders Did: Compounded stock of Enjay Butyl 218 (GRI-18) containing one part of Sulfasan R and compared it with standard butyl formulations.

The Result: The Sulfasan R stock after aging 48 hours at 300°F. showed the best retention of tensile strength, elongation, and hardness.

Helping you get the results you want is the only way we can sell. You're not interested in chemicals; but you are interested in *performance* at lowest possible cost. That's why manufacturers of rubber products discuss their processing and end-product requirements with Monsanto. Often, no special research is even needed—the answer to your formulating problem may already be on file among the more than 18,000 special research reports covering studies that Monsanto Akron has carried out for rubber processors. Write or call: *Monsanto Chemical Company, Rubber Chemicals Dept. RC-3 (telephone: HEmlock 4-1921), Akron 11, Ohio.*

SULFASAN: Reg. U. S. Pat. Off.

Accelerators • For fast, slow, and regulated rates of safe cure.

Antioxidants • For maximum oxidation resistance.

Specialty Compounds • For special processing problems.

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You be the Judge!

It's up to you to decide whether *your* rubber products will be found guilty of chemical B.O. acquired during processing. It is now possible for you to treat your batches with ALAMASK® odor-masking compounds that impart clean, neutral odors to your finished products. From the table below you can select the particular ALAMASK for your application —

"ALAMASK" TYPE RECOMMENDED	Latex					Dry Rubber				Elasto-Plastics		
	Foam	Sponge	Dipped Goods	Bonded Fibers	Adhesives	Natural	Synthetic	Reclaim	Chemically Blown	Polyvinyl	Polyaryl	Plastisols
AA										X	X	X
AF					X		X		X			
AO or AO-X					X	X	X		X			
AR or AR-F			X		X							
BF or BG-X	X	X	X		X	X	X					
BGM or BGM-X	X	X		X		X						
CY					X				X			
DJ	X	X	X				X		X			
DL							X		X			
H			X		X			X	X	X	X	
LD	X	X	X	X	X	X		X				
ND or ND-X	X	X	X	X	X	X	X	X	X	X	X	
O	X	X	X	X		X	X		X	X	X	X
OS or OS-X	X	X	X	X			X					

For use in latex, the water-dispersible "ALAMASK" form is recommended. The water-dispersible forms are designated by "-X" or "-F" following the "ALAMASK" type name.

ALAMASK has no effect on processing characteristics or rate of cure... the only noticeable effect you will detect will be the upward trend of your sales curve!

NOTE

ALAMASK also abates malodors from stack fumes and plant effluents.

Rhodia INC. For technical data and assistance, write RHODIA, INC., 60 E. 56th ST., NEW YORK 22, N. Y.

Philadelphia ● Cincinnati ● Chicago ● Los Angeles
Canada: Naugatuck, Montreal ● Cuba: Luis Felipe, ● Havana
Mexico: Comerciale Reka, Mexico City

Rubbermaid Products for Home

Wooster Rubber Co., 1255 Bowman Street, Wooster, Ohio, has added four new and colorful products for the home to the "Rubbermaid" line. The new products include a sink liner mat (shown herewith), which will be available in two sizes, a cutlery tray, a 20-inch high wastebasket and a pail cover which converts the company's "Busy Bucket" into a covered pail. The new sink liner mat is marketed in 18 by 20-inch and 20½ by

24-inch sizes, with both sizes in seven colors. Designed to fit all single and double bowls, both mats have an adjustable side protector design which converts any size or style of sink into a safe, colorful clean-up area. Perforated and raised ribbing permits thorough drainage.

The cutlery tray, 12 by 14 by 1⅞ inches, with separate compartments for knives, forks, spoons and extra kitchen equipment, fits all standard drawers and is produced in four colors. The extra-large wastebasket, 14¾ by 10¾ by 20 inches high, is also made in four colors. Its rectangular, space-saving design, makes it ideal for kitchen, laundry or workshop use, the company states. Other merchandising assets listed are unbreakability, flexibility and cleanliness (it can be wiped off with a damp cloth). The pail cover, measuring 8 by 11 inches, is designed for a snug fit atop the present "Busy Buckets," converting them into sanitary diaper pails, refuse containers, soft drink coolers, picnic carryalls, etc.

Foamed Vinyl Speaker Jacket

An improved hospital pillow speaker developed by Executone, Inc., New York, N. Y., is enclosed in a Vinylfoam jacket which permits the sensitive sound reproducer to be subjected to extreme abuse without injury. The protective jacket, designed by Executone, is manufactured by Aquador Plastics, Inc., 62 18th Street, Brooklyn, N. Y. The Vinylfoam is completely covered by a sheet vinyl cover, and the closure is accomplished by a single operation through electronic heat-sealing. Protected in this way, the instrument can fall from the bed, strike against the wall, and withstand other treatment common to hospital equipment. The vinyl casing can be sterilized in alcohol and can be replaced at a nominal cost.

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Specially prepared, white, coated precipitated calcium carbonate of fine particle size.
SILENE®
Very finely divided, white, precipitated calcium silicate.
HI-SIL®
Precipitated silica with specific gravity of 1.95 and an average particle size of .025 micron.

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Are you faced periodically with the problem of improving certain properties or color in some of your rubber products?

As you know, the answers frequently can only be found through experimentation. That is why it is always a good idea to keep experimental working samples of Calcene, Silene, and Hi-Sil on your laboratory shelf for ready use.

In more times than not, one of these white reinforcing pigments, or a combination of them, will give you the precise property you are seeking. And, surprisingly enough, the improved rubber product in many instances costs no more, and often less.

Write today for experimental samples of these exclusive Columbia-Southern pigments—Calcene, Silene, Hi-Sil. It will cost you nothing but it may help you get new business, save time and money. Use the coupon below.

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Separator for rubber tape—just the right "release" action

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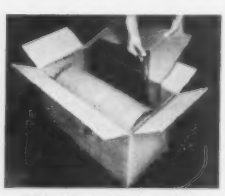

Effective separator sheet for uncured, natural or synthetic rubbers

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Correct "releasing" action in almost any situation is provided by new *low cost* Patapar Releasing Parchments. These special types of Patapar Vegetable Parchment excel as a backing material, liner, interleaver, overwrap, separator sheet and many other uses.

Features of Patapar Releasing Parchments include: *dense, fibre free texture; high resistance to penetration or migration of oil and softeners; permanent releasing action.*

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HI-WET-STRENGTH · GREASE-RESISTING

HEADQUARTERS FOR VEGETABLE PARCHMENT SINCE 1885

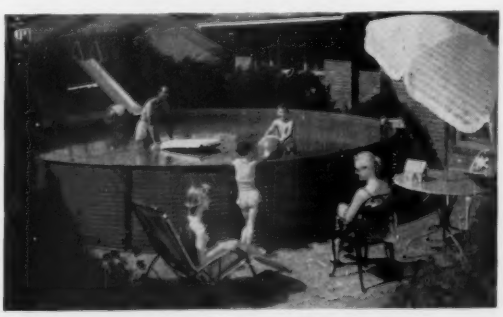
Rempel "Life-Like" Pony

Remple Manufacturing, Inc., 396 Morgan Avenue, Akron, Ohio, has introduced a new riding toy, the "Life-Like" Pony, which is molded of rubber and mounted on chrome-finished steel. The pony body is made of pure natural latex rubber, reinforced with steel. It measures 32½ inches in length, 19 inches high and 7½ inches wide. Mounted on a steel frame with

four springs for bucking action, the dimensions are increased by more than 10 inches in all directions. The pony is available in chestnut, white and palomino finishes, protected with a urethane coating. The "Life-Like" Pony is believed to be the largest hollow rubber product ever molded in a single piece. The head can be reined in or turned from side to side, and the tail can also be moved. The toy is durable and washable, the company reports.

Portable Above-Ground Pool

A new portable, above-ground swimming pool made of nylon fabric coated with Geon polyvinyl material is manufactured by the Hettrick Manufacturing Co., 1405 Summit Road, Toledo, Ohio. The new pool, trade marked "Ole Swimming Hole," is available in square, rectangular and circular shapes in sizes ranging from 42 inches by



66 inches to 20 feet in diameter. When filled with water, sides of the 20-foot pool, which are about three feet high, are supported by a wire screen and sturdy metal tubular supports which are easy to set up and dismantle. The fabric, which is aqua blue in color, is waterproof, resistant to wear and tear, impervious to mildew, and the color is long-lasting and will not fade.

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Do you need a sulfur that won't "bloom" on white or pastel rubber? Stauffer's Crystex® is what you need . . . indeed, it's what you *must* have when you need an almost completely insoluble sulfur. Crystex is exclusive with Stauffer. Crystex fineness and other characteristics are unmatched . . . unduplicated . . . unapproached . . . unique. Crystex is a product of Stauffer Research, developed to meet special needs of the rubber industry. Available for immediate shipment in carloads, truckloads or smaller quantities.

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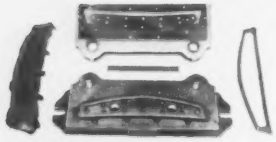

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performs many operations basic to the rubber industry. It cuts, punches and trims in one swift precision perfect operation.

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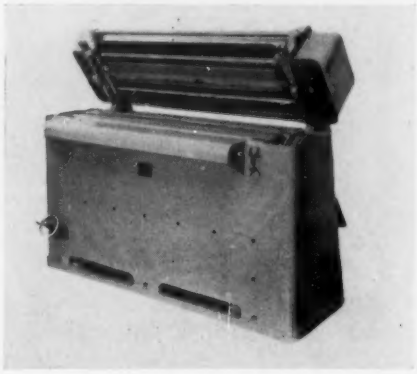
New Equipment

Wesero Rubber Grinding Machine

A machine for grinding and equalizing rubber and PVC sheets for shoe soles or floor covering purposes has been introduced by Stahlkontor Weser through their sales agent, Hans Lenze & Co., K.G., P.O. Box 187, Hameln, Germany. The machine is designed to roughen rubber sheets and at the same time grind them to any required thickness to an accuracy of 0.004 inch. Thin rubber sheeting in rolls can be handled in the same way



as sheets of thick rubber. Up to 0.040 inch can be ground off thick sheets in one pass but thin or very soft rubber must be ground more lightly and only 0.004 inch to 0.010 inch removed at a time. The machine is built in three models: (1) GS 200/1200 for rubber sheeting from 3/32 to 1½ inches thick; (2) GS 200/2000 for sheeting from 1/16 to 1½ inches thick; (3) GS 150/3000 for sheeting from 0.040 to 1½ inches thick.

The machine's principle of operation is that rubber is fed through the unit by two pairs of transport rollers, each about 3⅛ inches in diameter, the speed of which is variable from 10 to 30 feet per minute by means of an infinitely variable V-belt drive. The two bottom rollers are serrated to give a good grip and the top rollers are spring loaded. An automatic switch stops the machine in case it should be overloaded. Guide bars lead the material from the feed rollers to the point of grinding, and from there to the delivery table at the back of the machine. The abrasive paper can be renewed in a very short time, not more than five minutes. It is wound spirally around the smooth grinding roller and is secured by an automatic tensioner. Over-all dimensions of the apparatus are: table height, 35½ inches (approximate); weight, 1½ tons; over-all width, 71 inches; length, 47 inches, and length with delivery table, 63 inches.

Wheelco Instruments Division, Barber-Colman Co., Rockford, Ill., has announced the development of a new **Series 8000 electronic potentiometer-recorder** of the null-balancing type. The unit is available in a wide range of models which measure, indicate, control, and give a permanent record of such variables as temperature, speed, strain, hydrogen ion (pH), and other quantities that can be resolved into electrical signals.

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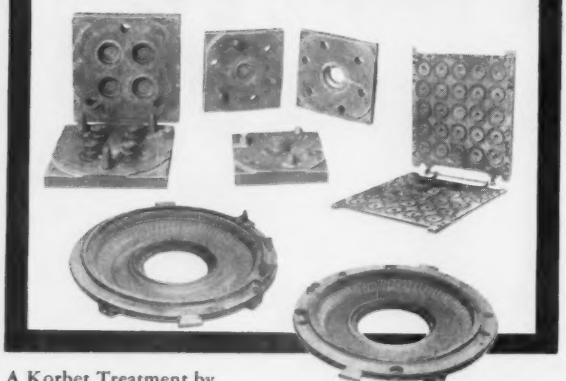
TYPICAL KORBET TREATED MOLDS



A Korbet Treatment by absorbing lubricant in cavity surfaces will show you a tremendous improvement in mold release and decrease in rejection.

FREE! Write for Bulletin T-45, which completely describes the advantages obtained from a Korbet mold release Treatment.

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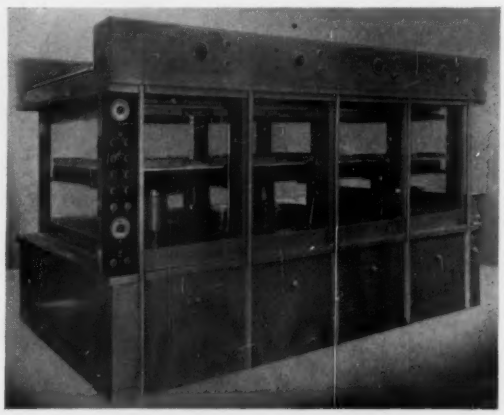
Pasadena PHI Multi 560 Ton Press

To meet the press requirements of the manufacturer involved with dies and molds of wide variance in sizes and applications, Pasadena Hydraulics, Inc., 273 North Hill Ave., Pasadena 4, Calif., have added to their regular standard line of presses the PHI Multi 560 Ton Press. The mold area of the press is 54 x 110 inches and a total pressure of 560 tons is obtained by eight 70

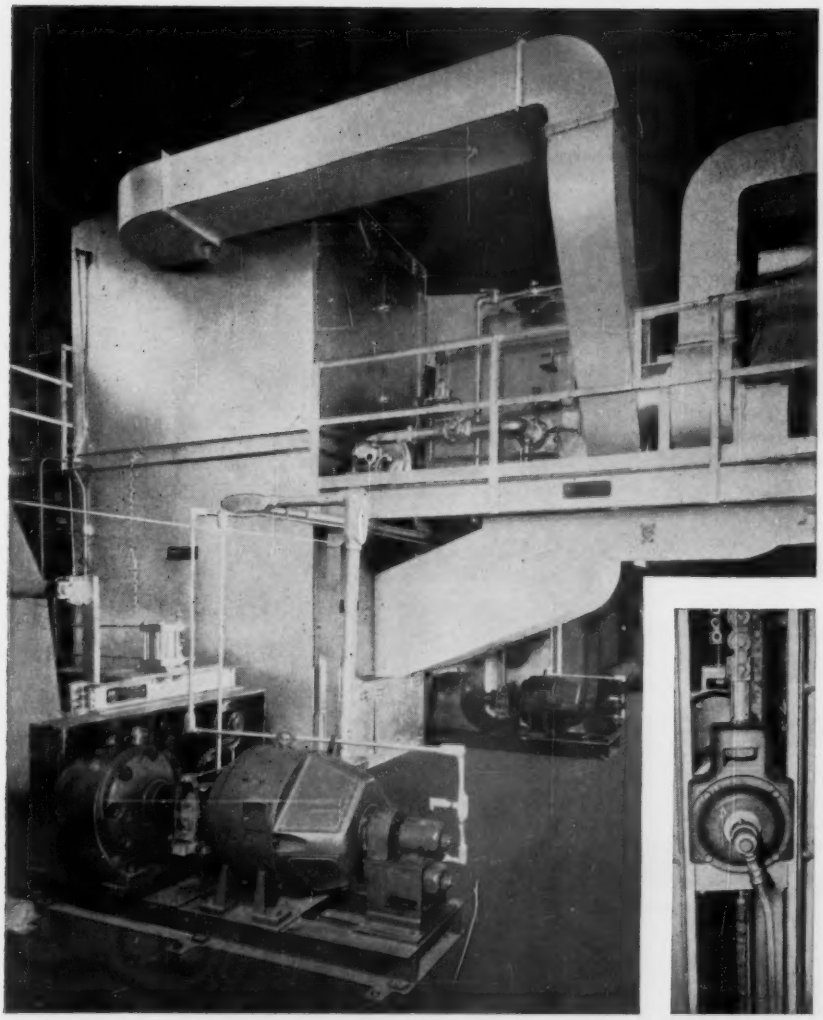


ton rams pressing in unison upon separate 24½-inch square platens. Each platen has cast-in calrod heaters with individual temperature controls to 600°F. The unit has a nine-inch stroke with a maximum opening of 18 inches. A central control panel coordinates all or any two grouping rams. Separate controls located at each station permit the machine to be operated as eight 70 ton presses entirely independent of each other.

Tensitron Tension Meter

A new tension meter that is said to safely measure tensions up to 20 pounds during the processing of wires, cables, coils, cords and other filamenteous materials has been announced by Tensitron, Inc., Harvard, Mass. The instrument uses an original lever design to insert the meter into the wires or cords. The handle is moved sideways from the top of the instrument and as far away as possible from the running wires so as to eliminate risk to the operator's hands. The base of the instrument has pointed guides so that the apparatus can be inserted between wires running in parallel and one picked out of several without stopping the machine or having one's hands near the cutting edges. All manual operations to check tensions in close proximity to and between the quickly moving, dangerous wires are now said to be made unnecessary.

The meter is approximately 8 inches high, 6 inches wide and has a depth of 2½ inches. The legible dial is 3½ inches in diameter. Overlapping in its lower range with more sensitive instruments, the high capacity meter uses a "compressed" dial. The digits denoting the first 4½ pounds tension occupy a space of approximately one-quarter of the dial circumference. Thus, there is overlapping in reading tensions in the low range of the new 20 pound instrument with the more sensitive standard line of 1000 gram tension meters used successfully for lower tensions.



Within the first day of startup, full width nylon tire cord processed in this 30-yard-per-minute, 14,000-pound-tension **IOI** Rollevator® Oven*, was made into aircraft tires meeting all qualification tests.

The Rollevator® roll automatically moves up and down within the oven, in direct relation to line speeds. Thus, at *any line speed, heat-exposure* time of the nylon is held *constant* at a constant temperature setting and at constant tension.

Rollevator® Oven* hot stretches nylon tire cord at constant optimum temperature, constant time and constant tension, at variable line speeds

The IOI Rollevator® Oven* is the answer to more uniform hot stretching of nylon with greater production efficiency. Simple and automatic in operation, it practically eliminates costly shutdown and repair time. When the line is stopped the Rollevator® roll automatically lowers out of the heat zone, eliminating the need for quick cool purging of the oven and the time and expense involved in reheating the oven when starting up again. Its low operating cost combined with low initial cost assures you of lower production cost. An IOI sales engineer will be glad to give you complete information about the Rollevator® Oven* and to discuss your requirements for any system from 3 to 100 yards per minute.

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The most modern machine for HYSTERESIS TESTS on rubber and rubber-fabric combinations. It may be used to study the effects on heat generation of the time of cure, the magnitude of the applied load, changes in pigmentation, and variations caused by anisotropy in rubber compounds. Structural changes such as softening or stiffening may be followed during the period of flexure.

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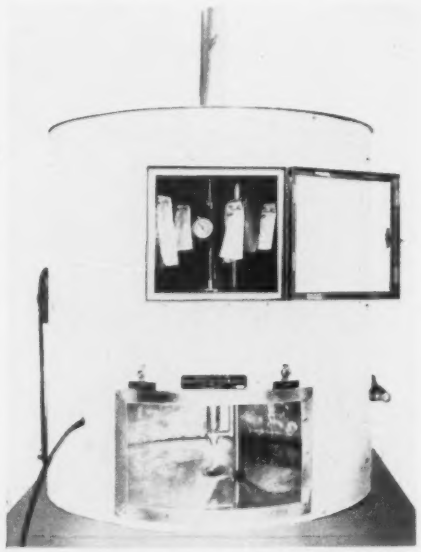
U.S. Testing Gas Fading Chamber

Designed for evaluating atmospheric gas reactions of such fume-vulnerable goods as rubber, plastics, coated paper and dyed textiles, a new testing instrument, called the Gas Fading Chamber, has been announced by the United States Testing Co., 1415 Park Ave., Hoboken, N. J. It is adapted for testing the gas resistance of dyes and pigments, checking the efficacy of inhibitor substances, and analyzing the susceptibility of specific materials to gas absorption. The apparatus is made in two models, the Drum type and the Squirrel Cage type. Both models conform to specifications of the American Standards Association and the American Association of Textile Chemists & Colorists. The drum type also conforms to A.S.T.M. specifications. Both instruments feature a corrosion resistant chamber, self-sealing closure and exhaust vent which permits operation with a wide variety of gas fumes. By introducing special valve ports into the main supply line, it is possible to mix and feed controllable quantities of different gases to the chamber. In addition, the automatic rotation of samples in the chamber assists gas circulation and achieves uniform exposure conditions. Interior lighting permits observations to be recorded during progress of the test and a dial thermometer enables testing to be accomplished at a known temperature.



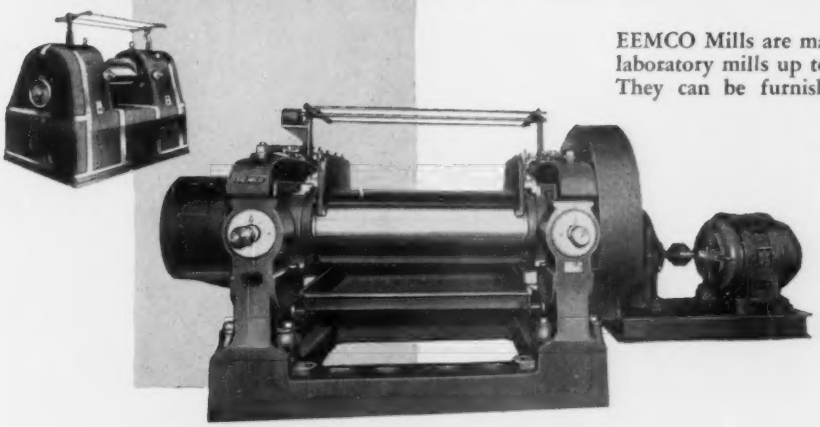
Designed to assure users a large capacity shaker with relatively small dimensions, the **Recipro-Glide Shaker** has been introduced by the New Brunswick Scientific Co., New Brunswick, N. J. The new unit features a carriage that extends the length and width of the machine and can be equipped alternately with flask platforms for shaking bottles, cans, carboys and other containers.

Featured in a redesigned **solvent recovery still,** available from the Precision Scientific Co., Chicago, Ill., is the use of a three-heat hot plate which permits rapid heating of the fluid until distillation begins and reduction of heat thereafter to maintain the desired distillation rate.

available in a complete range of sizes

EEMCO RUBBER and PLASTICS MILLS

are engineered for your job in STANDARD or CUSTOM units



EEMCO Mills are made in standard sizes from laboratory mills up to and including 84" mills. They can be furnished with any extras you desire, including individual drives, right angle or floor level drives, or for "in line operation."

Consult EEMCO before you buy; call or write us today stating your requirements.

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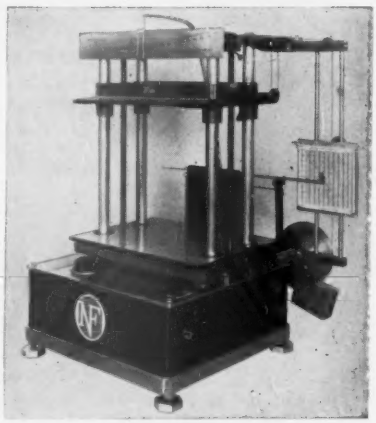

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Mount Hope SYSTEM

SLACK SELVAGE ELIMINATOR
assures *even* coating, averts seconds

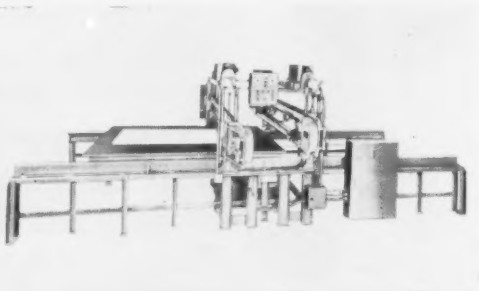
Slack Selvage Eliminator Ahead of Coater yields smooth full-width feeding with no slack selvages or wrinkles to cause costly seconds. Single expander prevents wrinkling at wind-up.

Tell us your coating problem. A Mount Hope Engineer will be glad to advise you.

MOUNT HOPE MACHINERY COMPANY
181 FIFTH ST., TAUNTON, MASS.

Falls Double Head Splitting Machine

A table type leveling and splitting machine with twin cutting heads for use on synthetics such as polyurethane and polyvinyl has been announced by the Falls Engineering & Machine Co., Cuyahoga Falls, Ohio. Completely automatic, the new machine levels and splits stock to ⅛ inch, thinner (1/16 inch) with some materials, and handles slabs of synthetic foam 84 inches maximum width and 13½ feet long. A slab of stock is placed on



the power-driven table which then moves toward one of the two splitting heads and a sheet of stock is sliced off the slab. This head automatically adjusts itself to clear the stock and the table moves on, reversing itself and returning to the original position. A second splitting head has meanwhile indexed itself into splitting position, and a second cut is made of pre-determined thickness. The operation continues until the slab is entirely cut. The table moves the entire length of the machine, then reverses itself and returns. There are four table sizes: 64 inches wide x 110 inches long; 64 inches wide x 162 inches; 84 inches x 110 inches, and 84 inches x 162 inches. The two splitting heads are vertically adjustable at a point ¼ inch above the table top and from there to 12 inches above the top. An automatic self-indexing mechanism accurately sets the depth of the cut to the required thickness.

Atmosphere Control Cabinet

Designed so that it can be used efficiently in any part of the laboratory in conjunction with breaking strength and tensile strength testing machines, a new temperature-conditioning unit, called the Hot and Cold Cabinet, has been introduced by the Atmosphere Control Co., Inc., 5315 Chester Ave., Philadelphia 43, Penna. The unit is available in two models: Type I, stationary, and Type II, ambulatory (movable). The apparatus has a temperature range of —100° to 600°F. and can be equipped with various temperature controls from vapor pressure to electronic types. The ambulatory model is mounted on a lift truck which allows the unit to be moved to a tensile testing machine so that the samples may be tested according to A.S.T.M. or other specifications. The refrigeration system is of the cascade type using a new type of gas which is said to be non-inflammable and non-explosive and has similar characteristics to the Freon group. According to the company, the unit can be brought down to a very low temperature with a moderate vacuum using smaller compressors and less horsepower and can obtain a temperature of —100°F. with only 20 inches of vacuum.

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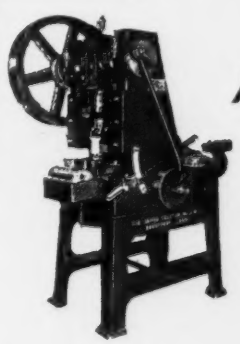

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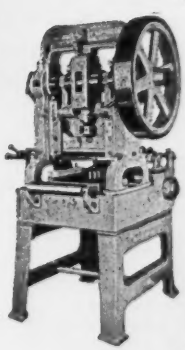

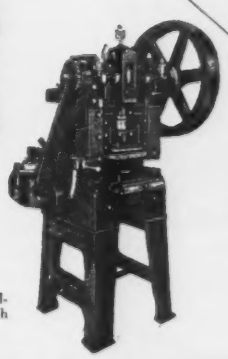

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Reviews

BOOKS

Polymer Processes. Edited by C. E. Schildknecht. Published by Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y. 6 x 9 in. 914 pp. $19.50.

Issued as Volume X in the series of monographs on the chemistry, physics and technology of high polymeric substances currently being published under the general title of "High Polymers," this book represents a bridge between the rapidly advancing theory of high polymers and the equally striking advances in the techniques of preparation, formulation and shaping of rubbers, plastics, fibers and adhesives. Consisting of 18 chapters, each prepared by an outstanding expert in the particular field covered, it fosters understanding between the polymer scientist and the engineer. Its contents range from mechanisms of polymerization to methods of forming fibers and adhesives. Wherever possible, polymer processes and reactions have been related to basic concepts of organic and physical chemistry.

The specific contents of the work can best be appreciated by the chapter titles, which are as follows: (1) Introduction to Free Radical Polymerization; (2) Polymerizations in Bulk; (3) Polmyerizations in Suspension; (4) Polymerizations in Emulsion; (5) Polymerizations in Solution; (6) Ionic Polymerizations; (7) Polyamides and Polyesters; (8) Condensations with Formaldehyde; (9) Cellulose and Cellulose Derivatives; (10) Epoxy Resins; (11) Polysulfide Polymers; (12) New Adhesives; (13) Stabilization of Polymers; (14) Paste Techniques; (15) Latex Techniques; (16) Compounding and Processing Rubbers and Resins; (17) Polymer Reinforcement; (18) Spinning and Drawing Fibers. Extensive literature references appear with each chapter.

Although practically every chapter is of direct interest to the rubber chemist and engineer, several of the chapters hold special interest. For example, the chapter on "Compounding and Processing Rubbers and Resins," prepared by G. S. Garvin (Goodrich), runs 81 pages in length and is an excellent condensation of a big subject. It covers general compounding ingredients, general processing methods, general compounding methods, and compounding and processing both synthetic rubbers and synthetic resins. It includes a comprehensive table on commercial polymeric materials, divided into elastomers, thermoplastics and thermosetting resins. The chapter on "Polysulfide Polymers," prepared by E. M. Fettes and J. S. Jorczak (Thiokol Chemical), 24 pages in length, covers preparation, polymer properties, aqueous dispersions, and the compounding and applications of both crude or bulk rubbers and the liquid polysulfide polymers.

Rubber in one form or another occupies some attention in almost every one of the topics covered. The chapter on "New Adhesives" includes a section devoted to rubber-resin adhesives, that on "Stabilization of Polymers" a section on stabilization of rubbers, while the chapter on "Latex Techniques" covers both the elastomeric and plastomeric latices. In all of these chapters, theory is combined with practicality to give the reader the widest possible scope. Academic references, patents and working experience have been employed in each case to present as clearly as possible the status of art, techniques and knowledge.

•

Clinic Proceedings: 1955. Published by the Industrial Management Society. 35 East Wacker Dr., Chicago 1, Ill. 8½ x 11 in. 156 pp. $5.00.

Complete transcripts of talks given by top leaders of labor, management and government at the 19th Annual Time and Motion Study and Management Clinic sponsored by the Industrial Management Society are included in this book. The various topics discussed include time study, motion economy, methods, plant layout, production control, wage incentives, maintenance, and human relations. The book also contains charts, forms and photos to illustrate the various talks.

The Chemistry of High Polymer Degradation Processes. By Norman Grassie. Published by Butterworths Publications, Ltd., 88 Kingsway, London, W.C.2, England. American edition published by Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y. 5½ x 8½ in. 336 pp. $6.50.

Although interest in polymer degradation reactions was originally concerned with the elucidation of the chemical structure of natural polymers, the origin of the more recent advances in the subject are bound up with the development of the synthetic plastics. Thus, it has been necessary for the industrial chemist to investigate these processes for a better understanding of the behavior and particularly the deterioration of commercial materials. It has also produced a vast new range of substances, the unique molecular structure of which results in their undergoing quite novel types of reaction which are worthy of study for their own sake and for the general advancement of chemical knowledge.

In recognition of the above, the author has prepared the current work with three distinct groups of chemists in mind. Firstly, for the specialist in polymer chemistry, with an account of our present state of knowledge of polymer degradation reactions. Secondly, for the industrial worker, with a guide to the knowledge of the constituent reactions which must make up the composite weathering and deterioration processes with which he must deal. Finally, for the chemist with more general interests in the kinetics of chemical change who will find interest in both the classical and new types of reactions which occur in the unusual environment of polymer chains.

In a sense, therefore, this book is both a text and a discussion of the theory of degradation processes. After an introduction, the author discusses depolymerization, hydrolysis and other random chain-scission processes, oxidation, sulfuration and ozonization, and non chain-scission reactions. The latter section includes some data on the ionic reactions of rubber from the standpoints of cyclization and hydrochlorination. A subject index is included.

•

Polyesters and Their Applications. By Johan Bjorksten, Henry Tovey, Betty Harker and James Henning. Published by the Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y. 6 x 9 in. 618 pp. $10.00.

The first comprehensive survey of the entire polyester field from raw materials to fabricated product, this book has been painstakingly prepared from data assembled over a long period of years by the Bjorksten Research Laboratories, with which all of the authors are associated. The text and annotated bibliography of over 3300 references cover most phases of the production and use of polyesters through June, 1954, and use of the book permits the quick location of patents and literature bearing on any particular phase of the field. Included are not only the unsaturated polyesters used in molding, casting, coating, impregnating and laminating, but also the saturated materials used in the production of fibers, films, elastomers and foamed plastics.

The section on the unsaturated polyesters covers raw materials, resin manufacture, catalysis and inhibition, fillers and reinforcements, shaping, finishing, commercial resins, tailor-making, and final products. That on the saturated polyesters covers both the linear fiber-forming and the diisocyanate-modified materials. Other sections cover testing and health hazards. The annotated bibliography, which occupies approximately half of the total pages, is divided into patents and literature, both sections being clearly presented, with each reference having a one-sentence abstract of intent or content. Some pertinent references published after June 1, 1954, are given in a nine-page supplement. Author and subject indexes are also included.

We welcome the submission of published material for review in these columns.
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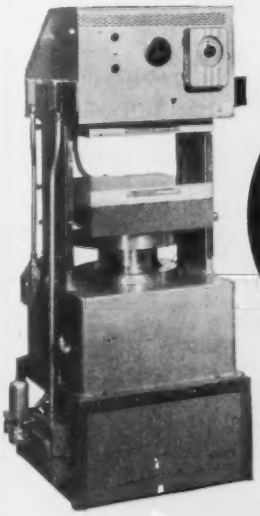

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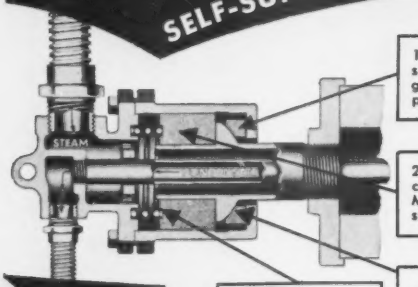
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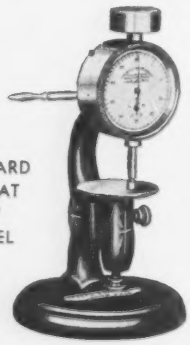

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A-C Polyethylene. (Bulletin No. 116). Semet-Solvay Petrochemical Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y. 8½ x 11 in. 14 pp.

Included in this bulletin is a brief description of current grades of A-C polyethylene as well as a listing of such typical properties of the material as average molecular weight, melting point, hardness, specific gravity and viscosity. Also included is a description of the many applications in which the material is currently being used. Such applications as rubber, printing ink, polish, fiber milk containers, wrappers for all types of packages, boxboard, butter cartons and laminated containers are given. The results of tests conducted to show the resistance of this material to chemical liquids as well as a grading of the compatibility of polyethylene with other materials are given. An index of manufacturers whose products are mentioned in the report is included.

•

Plaskon Polyethylene Lubricant 8407 in a Butadiene-Styrene Copolymer (Cold) Tread-Type Compound. (Rubber Laboratory Release No. 17). Barrett Division, Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y. 8½ x 11 in. 12 pp.

Included in this technical report is a discussion on the general behavior of the Plaskon polyethylene lubricants in a tread-type compound. Listing the various compounds used in the evaluation, the report contains data, outlined in tabular form, on such tests as stress at 300 and 500 percent, tensile, elongation, hardness, abrasion resistance (NBS), tear resistance (angle), compression, rebound (Goodyear-Healey) and crack-growth resistance (De Mattia). Hysteresis data (Goodrich Flexometer) as well as tension and hardness data on both unaged and aged specimens are included.

•

This is Du Pont: The Story of Science in Industry. Public Relations Dept., E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del. 9 x 12 in. 36 pp.

Six scientific principles and six inventions that reshaped civilization are described in this booklet. Also shown are six of the great monuments to science and invention including the Roman aqueduct at Nimes, France, and the Empire State Building in New York City. Through the use of illustrations the booklet traces the rise of science from pre-historic ages, and shows how today the industrial organization is the chief means for coordinating scientific knowledge, invention and technology to serve the needs of man. Also included is a discussion of management's role in the development and marketing of a new product.

•

Thiokol Galex. Thiokol Chemical Corp., 780 N. Clinton Ave., Trenton 7, N. J. 9 x 11¼ in. 12 pp.

Describing the functions of Galex in GR-S, Neoprene Types GN and W, natural and reclaimed rubber, this bulletin also includes data on the typical properties of the material in both its solid and pelletized form. A table shows the effect of 10 to 40 parts of the material on GR-S tread type compounds. Data given shows the results of such physical tests as tensile, elongation, modulus and hardness for each compound at various cure times. The bulletin points out that the use of the pelletized form, developed by the Battelle Memorial Institute, presents a number of handling advantages to the processor.

•

The Torrance Plant. Synthetic Rubber Sales Div., Shell Chemical Corp., P. O. Box 216, Torrance, Calif. 11 x 8½ in. 24 pp.

How synthetic rubber is made and where it is used is explained in this booklet in simplified form. Of special note is a flow sheet explaining the process used in making synthetic rubber. In addition to describing the physical plant at Torrance, California, the booklet also contains brief descriptions of its personnel, research objectives, activities group and employee benefits.

Monsanto Blowing Agents BSH and OB. Monsanto Chemicals Ltd., Victoria St., London S.W. 1, England. 8 x 10 in. 12 pp.

Contained in this technical report is information regarding two new blowing agents developed by Monsanto. Such characteristics of the materials as chemical composition, appearance, decomposition temperature, available gases, volume of gas liberated, odor of powder and storage stability are given. Included in the report is a listing of four compounds employing the blowing agents and a follow-up discussion on the use of these materials under factory conditions. Photographs show the uniform and fine cell structure produced by using these agents and illustrate the degree of blow which can be obtained by using the stated proportion of blowing agent. In order to assist potential users, some typical compounds using these agents are shown. The compounds are low density cheap sponge for carpet underlay, microcellular soling, semi-expanded soling, expanded ebonite, high quality black sponge and synthetic rubber sponge (oil resistant).

•

Cellobond Rubber Reinforcing Resins. (Bulletin No. K1). Information Dept., British Resin Products, Ltd., Devonshire House, Picadilly, London, W. 1. England. 8¼ x 10¼ in. 36 pp.

Divided into three parts, this technical report treats, in part one, with the processing of Cellobond resins in natural rubber and discusses the use of these materials in soft and semi-hard vulcanizates as well as in hard rubbers. An accelerator study compares the effect of various types of accelerators in a resin-reinforced natural rubber compound and includes the results of such physical tests as tensile, elongation, modulus and durometer. Part one also contains information on the influence of these resins in a natural rubber compound with respect to accelerated aging and electrical properties. Part two discusses the use of the resins with Hycar 1001 and 1002. Included are the results of various tests which show the effect of resin loading on solvent and oil resistance and on mechanical and electrical properties. Part three contains information on the various test methods used in evaluating these resins in natural and nitrile rubbers.

•

Ucon Fluids and Lubricants. (Form 6500D). Carbide & Carbon Chemicals Co., 30 East 42nd St., New York 17, N. Y. 8½ x 11 in. 52 pp.

Of interest to lubrication engineers as well as process engineers and chemists, this booklet, through the use of charts, graphs and photographs, describes the uses and applications of the company's line of polyalkylene glycols and derivatives. A description of these fluids for use as lubricants in rubber is followed by a chart showing the effect of the various fluids on natural rubber, Buna S, Buna N, butyl, neoprene and silicone rubber. The results of such tests as linear swell and hardness change are given. Also included is a discussion of their uses as mechanical lubricants, hydraulic fluids, textile lubricants, heat-transfer fluids, anti-foam agents, solvents, and formulation components. Other charts and graphs in the booklet show such properties of the fluids as spontaneous ignition temperatures, solubilities, evaporation rate, viscosities and hygroscopicity. A bibliography is included.

•

Tygoweld Adhesives. Adhesives Div., U.S. Stoneware Co., Akron 9, Ohio. 8½ x 11 in. 36 pp.

Describing the Tygoweld adhesives, which consist of a series of thermosetting adhesives in paste, powder, rod, film or mat forms, based on synthetic components, this bulletin contains instructions on how to bond these materials either to themselves or to other materials. The general properties of the adhesives are contained in an adhesives chart which shows such properties as physical form, color, weight per gallon, coverage, how applied, shelf stability, maximum service temperature and general bond resistance. To help the design engineer in solving bonding problems, the comparative advantages of the adhesives over unmodified epoxies or mechanical fastening methods are given. A summary of recommendations for obtaining optimum results in the choice of the proper adhesive in relation to designs possible in joining materials is included.

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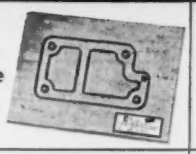

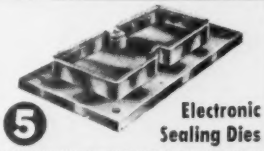

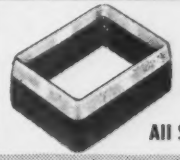

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MARKET REPORTS

TRENDS
NEWS
PRICES

Natural Rubber

Since our last report (July 31), the price of spot rubber on the New York Commodity Exchange has moved in a range of 325 points, high for the period being 37.25c reached on August 31, and low being 34.00c reached on August 6 and 7. The average price of spot rubber for the month of August was 35.69c based on 23 trading days. This compares with an average of 33.91c in the previous month.

We would first call our readers' attention to the revised method of listing closing rubber prices on the New York Commodity Exchange as they appear in RUBBER AGE. It will be noted that this information, which appears in the next column, now covers the No. 1 R.S.S. contract as well as the newly adopted "Rex" contract. It should be borne in mind that the No. 1 R.S.S. contract will expire on December 31, 1956. So that there is no abrupt break in the listings, however, we have undertaken the publication of prices from both contracts until the No. 1 R.S.S. contract expires.

Natural Rubber in 1957

Merrill Lynch, Pierce, Fenner & Beane hazards the guess that world natural rubber production, after receding to about 1,850,000 tons this year from 1,913,000 last, could equal or exceed that high level in 1957. This will depend on a number of factors, including incentive systems in Indonesia, government tax and export policies, replanting, strikes, etc.

Particularly, the 1957 figure will depend on the price factor. If prices stay at or above the 30c level, this in itself would be most stimulating. The rate of increase of synthetic plant capacity, and how much will actually be utilized will be another most important consideration.

Just what will represent the "rock bottom" preference for natural both in the United States and abroad will be paramount. For instance, a 1% preference ratio change in the United States alone would mean 15,000 tons. Monthly synthetic export rates will bear close watching. Foreign buying has been and can be a necessary spark to sharp price moves in natural.

MLPFB states that as compared with the rest of the world, the United States normally is easier to forecast. On the basis of increased automobile production, larger original equipment and replacement tire needs, and a continuing steady growth in non-transportation uses, domestic new rubber consumption in 1957 could slightly better the 1955 figure.

Russian Buying Growing

Russian buying this year to date has approximately equalled her entire absorption in 1955 of 70,000 to 75,000 tons. Because the Soviet rate of buying in the past few weeks has been slight, it is expected that she will re-enter the market for substantial quantities in the near future. It is also expected that Red Chinese purchases will total higher in 1956 than in the previous year. Trade pacts, now being negotiated between Red China and Malaya, may contribute to a rising volume of Chinese imports.

NEW YORK, AUGUST 31, 1956

Price Data

Closing Rubber Prices on New York Commodity Exchange

FROM AUGUST 1 TO AUGUST 31

	No. 1 R.S.S.			Rex		
Aug.	Spot	Sept.	Dec.	Sept.	Nov.	Sales
1	36.00	37.50	34.40	35.30	34.30	...
2	35.50	36.10	34.10	35.00	34.00	15
3	35.50	36.25	34.00	34.50	33.85	40
4	....	....	....	....	....	...
5	....	....	....	....	....	...
6	37.25	38.30	35.95	36.60	35.50	42
7	37.25	38.25	36.00	36.60	35.50	42
8	36.00	36.50	34.75	35.15	34.15	109
9	35.25	35.75	34.00	34.25	33.30	127
10	36.50	36.80	35.50	35.50	35.00	188
11	....	....	....	....	....	...
12	....	....	....	....	....	...
13	36.50	36.95	35.55	35.30	34.90	203
14	36.50	37.00	35.60	35.80	34.90	224
15	36.00	37.00	34.95	35.40	34.25	257
16	35.50	36.50	34.50	35.00	33.75	268
17	35.50	36.65	34.50	35.00	33.75	287
18	....	....	....	....	....	...
19	....	....	....	....	....	...
20	35.50	36.85	34.50	35.00	33.75	292
21	35.61	37.15	34.75	35.15	33.80	292
22	35.61	36.90	34.75	35.15	33.60	298
23	35.75	37.25	35.25	35.50	34.00	299
24	35.75	37.85	35.60	35.75	34.25	306
25	....	....	....	....	....	...
26	....	....	....	....	....	...
27	35.50	37.75	35.63	35.75	34.20	301
28	35.00	37.10	35.00	35.20	33.65	316
29	34.75	36.75	34.80	34.50	33.65	337
30	34.25	33.75	33.65	33.35	32.90	367
31	34.00	33.90	33.75	33.50	32.95	399

Outside Market

No. 1 Ribbed Smoked Sheets:	
Spot	.34
September	.33¼
October	.33½
Thin Latex Crepe:	
Spot	.44
Thin Brown Crepe, No. 2	.28
Flat Bark Crepe	.21

London Market
(Standard Smoked Sheets)

Oct.-Dec.	32.61 - 32.90
Jan.-Mar.	31.60 - 31.75

Singapore Market
(Standard Smoked Sheets)

Oct.	30.80 - 30.91

Middling Upland Quotations

	July 31	August 31		
	Close	High	Low	Close
Oct.	32.46	33.75	33.71	33.74
Dec.	32.62	33.87	33.78	33.83
Mar.	32.63	33.74	33.68	33.72

Notes and Quotes

Possible interruption of shipping through the Suez Canal should have little effect on supplies of natural rubber available to the United States, or to the rest of the world, in the opinion of John L. Collyer, chairman of the board of the B. F. Goodrich Co. "Crude rubber will be shipped by other routes in the unlikely event that this waterway is closed, or if conditions for using it are not acceptable to ship operators," Mr. Collyer said. "Less than 30% of the new rubber used in the United States this year has been natural rubber routed via the Suez Canal. Sixty-one percent of the rubber now being used in the United States is man-made rubber and thirty-nine percent is imported crude rubber. The high speculative prices for crude rubber that now prevail will further encourage use of man-made rubbers in the United States," he stated.

Synthetic Rubber

Some interesting comments relative to the ratio of consumption of synthetic to natural rubber were made in the September issue of *Natural Rubber News* by H. C. Bugbee, president of the Natural Rubber Bureau. Mr. Bugbee points out that during the first seven months of this year, the synthetic-natural ratio has remained remarkably constant at the 60-40 level.

It is pointed out that one should not infer from the aforementioned that the synthetic-natural ratio is frozen at the 60-40 level regardless of price for the long-run future. One can say, however, that the present requirements for natural from the quality standpoint makes price a lesser conversion influence than was the case previously.

Synthetic Stocks Rising

Mr. Bugbee also notes that July statistics confirmed an impressive increase in U. S. synthetic rubber stocks from about 170,000 tons at the end of June to about 188,000 tons at the end of July, an increase of more than 10% in one month. This compares with a stock of only 102,000 tons of natural.

In view of the fact that the synthetic natural ratio is remaining roughly constant and exports of synthetic are also remaining relatively steady at the 13,000 ton per month level, it would seem as though production for all synthetics in the balance of this year will be somewhat lower than the 90,000 tons per month averaged so far in 1956. As a matter of fact, Mr. Bugbee states, June/July production of synthetic rubber averaged only 86,500 tons and August is reportedly still lower.

GR-S type production in the first seven months of the current year has been averaging about 75,000 tons per month, but June and July production averaged only 70,000 tons and August again will be lower. Production of GR-S type in 1956 probably will be less than 875,000 tons compared with earlier estimates of more than 900,000 tons.

Butyl Production Rising

A significant feature of the July statistics is the sharp rise in butyl rubber production of 7,181 tons from 4,607 tons in June. At the moment, it looks as though butyl rubber production in 1956 may reach 75,000 tons, a figure considerably higher than previously estimated.

Neoprene production has been progressing steadily at a 100,000 ton per annum rate, as actually forecast by producers at the beginning of the year. N-types, as expected, have been averaging about 3,000 tons per month, although June/July production averaged only 2,300 tons per month, Mr. Bugbee notes.

With stocks of all synthetics rising at the end of July to the equivalent of three months' consumption, the question now arises as to whether the industry will cut production or build large stocks. The synthetic industry has greater flexibility than the natural rubber industry, and Mr. Bugbee believes that the August statistics, when released, should provide at least part of the answer.

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PRICES OF COMMERCIALLY AVAILABLE SYNTHETIC RUBBER POLYMERS

(dry types—per pound carload unless otherwise specified)

Butadiene-Acrylonitrile Types

Butaprene NAA	.5400 [1]
Butaprene NF	.4900 [1]
Butaprene NL	.5000 [1]
Butaprene NXM	.5800 [1]
Chemigum N1	.6400 [3]
Chemigum N3	.5800 [3]
Chemigum N5	.5800 [3]
Chemigum N6	.5000 [3]
Chemigum N7	.5000 [3]
Hycar 1001	.5800 [2]
Hycar 1002	.5000 [2]
Hycar 1014	.6000 [2]
Hycar 1041	.5800 [2]
Hycar 1042	.5000 [2]
Hycar 1043	.5000 [2]
Hycar 1312	.6000 [2]
Hycar 1411	.6200 [2]
Hycar 1432	.5900 [2]
Hycar 1441	.6200 [2]
Paracril AJ	.4850 [2]
Paracril B	.5000 [2]
Paracril BJ	.5000 [2]
Paracril BLT	.5000 [2]
Paracril C	.5800 [2]
Paracril CV	.5900 [2]
Paracril D	.6500 [2]
Paracril 18-80	.6000 [2]
Polysar Krynac 800	.5000 [3]
Polysar Krynac 801	.5800 [3]
Polysar Krynac 802	.5000 [3]
Polysar Krynac 803	.5000 [3]

Butadiene-Styrene Types

Ameripol 1001	.2410 [3]
Ameripol 1002	.2435 [3]
Ameripol 1006	.2410 [3]
Ameripol 1500	.2410 [3]
Ameripol 1501	.2410 [3]
Ameripol 1502	.2410 [3]
Ameripol 1703	.2060 [3]
Ameripol 1705	.2035 [3]
Ameripol 1706	.2035 [3]
Ameripol 1707	.1910 [3]
Ameripol 1709	.1885 [3]
Ameripol 1710	.1885 [3]
Ameripol 1711	.1885 [3]
Ameripol 1712	.1885 [3]
ASRC 1000	.2410 [3]
ASRC 1001	.2410 [3]
ASRC 1004	.2410 [3]
ASRC 1006	.2410 [3]
ASRC 1500	.2410 [3]
ASRC 1502	.2410 [3]
ASRC 1703	.2060 [3]
ASRC 1708	.1910 [3]
Baytown 1600	.1850 [2]
Baytown 1601	.1850 [2]
Baytown 1602	.1850 [2]
Baytown 1801	.1700 [2]
Copo 1500	.2410 [3]
Copo 1502	.2410 [3]
Copo 1712	.1885 [3]
FR-S 1000	.2300 [2]
FR-S 1001	.2300 [2]
FR-S 1004	.2300 [2]
FR-S 1006	.2300 [2]
FR-S 1009	.2600 [2]

Butadiene-Styrene (Cont'd)

FR-S 1010	.2650 [2]
FR-S 1012	.2700 [2]
FR-S 1013	.2600 [2]
FR-S 1015	.2800 [2]
FR-S 1500	.2300 [2]
FR-S 1502	.2300 [2]
FR-S 1703	.1950 [2]
FR-S 1705	.1925 [2]
FR-S 1710	.1775 [2]
Naugapol 1016	.2650 [3]
Naugapol 1018	.2700 [3]
Naugapol 1019	.2650 [3]
Naugapol 1021	.3000 [3]
Naugapol 1022	.2800 [3]
Naugapol 1023	.2850 [3]
Naugapol 1503	.2625 [3]
Naugapol 1504	.2950 [3]
Philprene 1000	.2410 [1]
Philprene 1001	.2410 [1]
Philprene 1006	.2410 [1]
Philprene 1009	.2550 [1]
Philprene 1018	.2700 [1]
Philprene 1019	.2650 [1]
Philprene 1500	.2410 [1]
Philprene 1502	.2410 [1]
Philprene 1503	.2625 [1]
Philprene 1601	.1910 [1]
Philprene 1605	.1870 [1]
Philprene 1703	.2060 [1]
Philprene 1706	.2030 [1]
Philprene 1708	.1910 [1]
Philprene 1712	.1880 [1]
Philprene 1803	.1720 [1]
Philprene 1806	.1760 [1]
Plioflex 1006	.2410 [2]
Plioflex 1502	.2410 [2]
Plioflex 1703	.2060 [2]
Plioflex 1710	.1885 [2]
Plioflex 1773	.2060 [2]
Plioflex 1778	.1910 [2]
Polysar Krylene	.2410 [3]
Polysar Krylene NS	.2410 [3]
Polysar Krynol 651	.1885 [3]
Polysar Krynol 652	.1910 [3]
Polysar S	.2410 [3]
Polysar S-50	.2410 [3]
Polysar S-65	.2410 [3]
Polysar S-X 371	.2550 [3]
Polysar SS-250	.3000 [3]
S-1000	.2300 [2]
S-1001	.2300 [2]
S-1002	.2325 [2]
S-1006	.2300 [2]
S-1011	.2325 [2]
S-1013	.2300 [2]
S-1100	.1850 [2]
S-1500	.2300 [2]
S-1501	.2300 [2]
S-1502	.2300 [2]
S-1600	.1850 [2]
S-1601	.1850 [2]
S-1602	.1850 [2]
S-1703	.1950 [2]
S-1705	.1925 [2]
S-1706	.1925 [2]
S-1707	.1800 [2]
S-1709	.1775 [2]
S-1712	.1775 [2]
S-1801	.1700 [2]

Butadiene-Styrene (Cont'd)

S-2000	.2275 [3]
S-2101	.2250 [3]
Synpol 1000	.2410 [3]
Synpol 1001	.2410 [3]
Synpol 1002	.2435 [3]
Synpol 1006	.2410 [3]
Synpol 1007	.2425 [3]
Synpol 1009	.2475 [3]
Synpol 1012	.2425 [3]
Synpol 1013	.2500 [3]
Synpol 1061	.2410 [3]
Synpol 1500	.2410 [3]
Synpol 1502	.2410 [3]
Synpol 1551	.2410 [3]
Synpol 1703	.2060 [3]
Synpol 1707	.1910 [3]
Synpol 1708	.1950 [3]
Synpol 1711	.1900 [2]

Butyl Rubbers

Enjay Butyl 035	.2300 [3]
Enjay Butyl 150	.2300 [2]
Enjay Butyl 165 NS	.2400 [2]
Enjay Butyl 215	.2300 [3]
Enjay Butyl 217	.2300 [3]
Enjay Butyl 218	.2300 [3]
Enjay Butyl 268 NS	.2400 [3]
Enjay Butyl 325	.2300 [2]
Enjay Butyl 365 NS	.2400 [2]
Polysar Butyl 100	.2450 [3]
Polysar Butyl 101	.2775 [2]
Polysar Butyl 200	.2450 [2]
Polysar Butyl 300	.2450 [3]
Polysar Butyl 301	.2550 [2]
Polysar Butyl 400	.2450 [3]

Neoprene

	(prices l.c.l.)
Neoprene Types AC and CG	.5500 [3]
Neoprene Type GN	.4100 [3]
Neoprene Type GN-A	.4100 [2]
Neoprene Type GRT	.4200 [2]
Neoprene Type KNR	.7500 [2]
Neoprene Type S	.4200 [2]
Neoprene Type W	.3900 [2]
Neoprene Type WHV	.3900 [2]
Neoprene Type WRT	.4500 [2]
Neoprene Type WX	.4100 [2]

Silicone Rubbers*

	(prices l.c.l.)
GE (compounded)	2.50 [3]
GE Silicone Gum (not compounded)	4.00 [3]
Silastic (compounded)	1.90 [3]
Union Carbide (gums)	4.00 [3]
Union Carbide (compounds)	2.50 [3]

Polysulfide Rubbers

	(prices l.c.l.)
Thiokol Type A	.4700 [2]
Thiokol Type FA	.6400 [2]
Thiokol PR-1	.9500 [2]
Thiokol Type ST	1.00 [2]

(latices—all prices per pound dry weight)

Butadiene-Acrylonitrile Types

Butaprene N-300	.4660 [1]
Butaprene N-400	.5400 [1]
Butaprene N-401	.5400 [1]
Chemigum 200	.4900 [3]
Chemigum 235	.5400 [3]
Chemigum 236	.5400 [3]
Chemigum 245	.4600 [3]
Chemigum 246	.4600 [3]
Hycar 1512	.4600 [3]
Hycar 1551	.5400 [2]
Hycar 1552	.4600 [2]
Hycar 1561	.5400 [2]
Hycar 1562	.4600 [3]
Hycar 1571	.5900 [3]
Hycar 1572	.5100 [3]
Hycar 1577	.4600 [3]

Butadiene-Styrene Types

Copo 2101	.2800 [3]
Copo 2102	.3100 [3]

Butadiene-Styrene (Cont'd)

Copo 2105	.3100 [3]
Copo X-765	.2900 [3]
FR-S 2000	.2600 [2]
FR-S 2001	.2600 [2]
FR-S 2002	.2850 [2]
FR-S 2003	.2950 [2]
FR-S 2004	.2950 [2]
FR-S 2006	.2600 [2]
FR-S 2105	.3100 [2]
Pliolite 2101	.3000 [2]
Pliolite 2104	.3200 [2]
Pliolite 2105	.3200 [2]
Pliolite X-765	.3000 [2]
Naugatex 2000	.2630 [2]
Naugatex 2001	.2630 [2]
Naugatex 2002	.2880 [2]
Naugatex 2005	.3000 [2]
Naugatex 2006	.2630 [2]
Naugatex 2101	.2850 [2]

Butadiene-Styrene (Cont'd)

Naugatex 2105	.3120 [2]
Naugatex X-767	.3230 [2]
S 2004	.2600 [2]

Neoprene

Neoprene Latex 60	.4000 [3]
Neoprene Latex 571	.3700 [3]
Neoprene Latex 572	.3900 [3]
Neoprene Latex 601-A	.4000 [2]
Neoprene Latex 735	.3800 [3]
Neoprene Latex 736	.3800 [3]
Neoprene Latex 842-A	.3700 [3]
Neoprene Latex 950	.4700 [3]

Polysulfide Rubbers

Thiokol Type MX	.7000 [3]
Thiokol Type WD-2	.9200 [3]
Thiokol Type WD-6	.7000 [3]

Notes: (1) Freight allowed. (2) Freight extra. (3) Freight prepaid. * Covers a wide range of compounds. Readers are urged to check specific prices with producers.

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MARKETS

(continued)

Reclaimed Rubber

Preliminary estimates by the U. S. Department of Commerce show that 156,166 long tons of reclaimed rubber were produced in the United States in the first six months of this year, compared with 165,158 long tons in the first six months of the previous year. The Department's figures show that 145,182 long tons of reclaimed rubber were consumed in the first six months of the current year, against the 161,747 long tons consumed in the first half of the preceding year. As of June 30, 1956, there were 35,323 long tons of reclaim on hand, against the 29,725 long tons on hand on June 30, 1955.

While both production and consumption have been running behind comparable 1955 figures, it does not appear, at this point, that either production or consumption figures in 1956 will fall much behind 1955. This is rather a good showing in comparison with other types of rubber. Current prices for reclaimed rubber as quoted by the trade, follow:

(Prices for All Areas Except Calif.)

	per lb.
Premium Grade Whole Tire	.11
First Line Whole Tire	.10½
Second Line Whole Tire	.10
Third Line Whole Tire	.09¾
Fourth Line Whole Tire	.09¼
Black Carcass	.14¾
No. 1 Light Colored Carcass	.20¾
No. 1 Peel	.11
Butyl Tube Reclaim	.15
Natural Rubber Black Tube	.15
Natural Rubber Red Tube	.21
Natural Rubber Gray Tube	.21

Scrap Rubber

Slow trading conditions generally characterize the scrap rubber market. Volume has been small in all grades, but the sales that were made were at established prices. Dealers are not reporting surplus inventories at this point. The approach of the Labor Day weekend had a still further quieting effect on the market.

Now that the summer vacation periods have drawn to a close, there may be some heightening of activity within the scrap rubber market. The season of increased industrial activity has now been entered and this should provide some stimulus to generally lagging sales.

Considering the lightness of the market, prices have held relatively firm. There does not seem to be any general move to either raise or lower prices to any appreciable extent within the foreseeable future, many in the trade believe. Current prices follow:

(Prices Delivered Akron)

Mixed tires	ton	15.00
Light colored carcass	lb.	.05½
No. 1 peelings	ton	45.00
No. 2 peelings	ton	30.00
No. 3 peelings	ton	21.00
Buffings	ton	16.00
Truck and Bus S.A.G.	ton	20.00
Passenger S.A.G.	ton	17.50
Natural Rubber Red Tubes	lb.	.07½
Natural Rubber Black Tubes	lb.	.06¼
Butyl Rubber Tubes	lb.	.03¾

Tire Fabrics

The Census Bureau reports that production of tire cord and cord fabric dropped 13% during the second quarter of 1956. Total output was put at 112,070,000 pounds, 17% below the second quarter of 1955. Production of rayon tire cord and cord fabric, also down about 17% from the first quarter of 1956, was an estimated 82,201,000 pounds.

During the same period, output of nylon tire cord and cord fabric increased 13%. Cotton cord and fabric, however, dropped 14%. Stocks of cord and cord fabrics on June 31, 1956, were 51,206,000 pounds, 3% above the 1955 date but 13% under the March 31, 1956, level.

Cotton Duck Prices Down

The trade reports that prices for cotton duck have been dropped by about three cents a yard as the result of declining raw cotton prices. The new crop year for cotton started on August 1, and the 1956 crop is already moving to market at prices around 1¼c to 2c a pound below a year ago. Dealers expect increased pressure on prices as volume expands.

Anticipation of such downward pressure already has been partly responsible for dipping prices on other cotton cloth types. Other factors which have entered into the picture include import competition, lower automobile output, etc.

The cut in duck prices marked the first such reduction since July, 1954, although individual price reductions have been posted in the meantime. Some merchandisers of the fabric concede the reductions were partly motivated by efforts to stimulate sales. "Some of our customers were holding off in anticipation of price changes," one official noted. A fair amount of business has been booked since, he added. "There hasn't been any stampede to buy, but our company is definitely satisfied."

Duck Production Increasing

Output of duck fabrics has increased steadily in the postwar period, aided by a national trend toward outdoor living that has boosted sales of awnings, tents and camping equipment. Mills turned out 245,700,000 linear yards of fabric last year, compared with 238,400,000 in 1954. Production amounted to 72,500,000 linear yards during this year's first quarter, up sharply from the 63,600,000 linear yards woven during the first quarter of 1955. Duck producers are looking for a pickup in the fall through purchases by firms making tarps and waterproof coverings.

(Prices f.o.b. Shipping Point)

Rayon Tire Cord

1100	lb.	.76
1650	lb.	.70
2200	lb.	.70½

Nylon Tire Cord

210	lb.	1.95
840	lb.	1.80

Rayon Graded Fabric

1100	lb.	.72
1650	lb.	.66½
2200	lb.	.66

Cotton Chafers

14.4 oz. (per square yard)	lb.	.70
9.25 oz. (per square yard)	lb.	.65
11.65 oz. (per square yard)	lb.	.61
8.9 oz. (per square yard)	lb.	.67

Liquid Latex

Natural: According to current estimates, imports of natural latex in the first six months of this year will approximate 43,500 long tons, about 5,000 long tons more than were imported in the first six months of the previous year. However, consumption of natural latex in the first half of the current year totaled only 35,000 long tons, compared with the 43,000 long tons consumed in the first half of 1955.

This consumption disparity shows up in the inventory figures. As of June 30, 1956, there were said to be about 20,000 long tons of natural latex on hand, contrasted with the close to 10,000 long tons on hand as of June 30, 1955. Notwithstanding this rather large inventory, the price of natural latex has been rising and at this writing stands at 40c per pound at East Coast ports.

Synthetic: Production of S-type latex in the first six months of this year has been paralleling the previous year at about 35,000 long tons. Consumption of S-type latex in the first half of the current year at 31,000 long tons is about 1,000 long tons more than were consumed in the first six months of 1955. Inventories, too, remain apace, with close to 7,000 long tons at the end of each period.

The same situation seems to apply to the N-type latices, with production and consumption in the first half of this year almost matching the figures for the first half of 1955. In the first half of 1956, about 5,000 long tons were produced and 4,000 consumed.

A little more than 5,300 long tons of neoprene latex were produced in the first half of this year and about 4,500 long tons were consumed. The figures were approximately the same at June 30, 1955.

Cotton

The price of middling uplands on the New York Cotton Exchange has moved in a range of only 40 points since our last report (July 31), high for the period being 34.50c reached on August 28, and low being 34.10c reached on July 1 and 3. The average price of middling uplands for the month of August was 34.31c based on 23 trading days. This compares with an average of 35.43c in the previous month.

The 1955 U. S. cotton crop amounted to 14,721,000 bales of 500 pounds gross weight, according to the U. S. Department of Agriculture. This final figure is an increase of about 60,000 bales over the Department's last crop estimate made in December, and is 7½% larger than the 1954 crop of 13,696,000 bales. The 1955 crop was a substantial 13½% over the 1944-1953 average of 12,952,000 bales.

During 1955, the average yield of lint cotton per acre planted was 417 pounds, a new record high which surpassed by a wide margin the previous record of 341 pounds per acre established in 1954. Further, the 1955 yield was 138 pounds above the 10-year average of 279 pounds.

The accumulation of a large stock of raw cotton has caused the government to further restrict the number of acres that farmers may plant in 1956. The national allotment for this year has been set at 17,437,000 acres or 4% less than the 1955 allotment of 18,159,000 acres. The Department of Agriculture has estimated that as of July 1 there were 16,962,000 acres of cotton under cultivation, a figure 2¾% below the alloted acreage.

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Photograph courtesy of Seiberling Rubber Company

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STATISTICS of the industry

PERTINENT INDUSTRY DATA

Natural Rubber in the United States

(Including Latex and Guayule)

(All Quantities in Long Tons)

Year	New Supply	Consumption	Re-Exports	Stocks On Hand at End of Period
1931	501,788	355,200	25,609	322,000
1932	414,668	336,700	20,937	379,000
1933	418,902	412,400	20,576	365,000
1934	463,018	462,500	23,856	355,000
1935	467,146	495,500	11,391	303,000
1936	488,145	575,000	12,582	223,000
1937	600,479	543,600	7,902	262,204
1938	411,983	437,031	5,652	231,500
1939	499,473	592,000	13,125	125,800
1940	818,243	648,500	7,060	288,864
1941	1,029,007	775,000	5,376	533,344
1942	282,653	376,791	10,856	422,714
1943	55,329	317,634	20,815	139,594
1944	107,834	144,113	9,665	93,650
1945	135,672	105,429	6,743	118,715
1946	400,687	277,597	4,338	237,467
1947	688,354	562,661	4,101	129,038
1948	735,227	627,332	6,673	141,541
1949	660,792	574,522	6,253	106,619
1950	802,249	720,268	8,644	89,215
1951	733,048	454,015	2,603	76,569
1952	805,997	453,846	3,024	95,260
1953	647,150	553,473	8,376	112,316
1954	596,848	596,285	7,443	104,543
1955	635,174	634,800	10,611	110,105
1955:				
May	61,042	54,746	683	106,650
June	52,762	56,282	682	101,491
July	43,626	46,166	906	105,782
Aug.	59,840	48,359	810	109,056
Sept.	50,459	50,963	980	113,185
Oct.	45,720	54,995	869	110,795
Nov.	50,509	52,769	1,102	103,764
Dec.	50,556	48,565	986	109,854
1956:				
Jan.	58,803	53,374	1,877	111,943
Feb.	53,353	50,285	752	111,832
Mar.	52,749	50,040	505	108,974
Apr.	51,394	47,446	731	109,822
May	39,789	48,342	753	107,324
June	.....	42,845	.....	100,328

Source: U. S. Department of Commerce.

U. S. Imports of Natural Rubber

Year	Dry: Long Tons	Dry: Declared Value	Latex: Long Tons	Latex: Declared Value	Total Imports
1935	453,134	115,299,448	13,553	3,782,222	466,687
1936	467,064	152,072,496	19,852	6,659,899	486,916
1937	574,600	237,307,041	23,185	10,213,670	597,785
1938	397,640	125,373,864	11,944	4,168,127	409,584
1939	469,946	167,586,780	27,437	10,467,552	497,383
1940	781,202	303,308,823	33,789	14,593,466	814,991
1941	989,498	401,976,317	34,797	15,965,627	1,024,245
1942	266,276	112,537,426	10,646	5,630,667	276,922
1943	50,358	31,369,198	1,890	1,312,202	52,248
1944	103,847	73,908,549	3,091	2,092,211	106,938
1945	134,408	95,814,102	4,773	3,115,853	139,181
1946	376,502	228,796,110	8,421	5,843,085	384,923
1947	691,087	306,951,814	17,542	9,787,722	708,629
1948	702,293	290,849,177	32,745	18,288,223	735,038
1949	630,808	225,343,624	29,743	14,968,650	660,551
1950	747,109	416,222,598	54,401	41,764,486	801,510
1951	677,874	727,343,348	54,963	80,178,309	732,837
1952	756,987	578,179,519	48,228	40,563,116	805,215
1953	571,635	284,909,223	75,511	46,353,333	647,146
1954	522,364	219,098,143	74,483	42,755,029	596,847
1955	542,507	360,435,303	92,825	80,163,114	635,332
1955:					
May	52,192	32,621,824	8,849	6,968,726	61,041
June	45,025	27,959,320	7,736	6,015,080	52,761
July	34,924	21,653,274	8,702	6,855,619	43,626
Aug.	50,954	32,782,273	8,886	7,071,971	59,840
Sept.	42,350	29,854,781	8,108	7,902,094	50,458
Oct.	38,820	30,746,494	6,900	7,539,732	45,720
Nov.	43,423	34,989,275	7,085	8,063,930	50,508
Dec.	41,759	34,512,483	6,436	6,853,858	48,195
1956:					
Jan.	48,476	38,397,341	10,328	10,355,488	58,804
Feb.	45,682	35,983,385	7,670	7,814,076	46,449
Mar.	44,947	35,238,125	7,791	7,507,686	52,738
Apr.	44,443	31,826,631	6,996	6,369,348	51,439
May	34,058	22,579,829	5,731	4,782,907	39,789

Source: Bureau of the Census, U. S. Department of Commerce.

World Production of Natural Rubber

(Including Latex)

(Long Tons)

Year	Malaya	Indonesia	Ceylon	Viet Nam & Cambodia	Latin America	Rest of World*	Total*
1944	25,000*	50,000*	98,500	60,419	49,946	77,000	360,000
1945	8,600*	10,000*	97,500	12,000*	47,125	73,570	250,000
1946	403,719	175,000*	94,000	19,975	39,678*	105,080	837,500
1947	646,362	277,951	89,000	38,128	34,928*	172,782	1,260,000
1948	698,189	432,349	95,000	43,935	29,158*	225,557	1,525,000
1949	671,503	432,996	89,500	43,010	27,318*	225,659	1,490,000
1950	694,090	696,472	113,500	48,482	26,902*	280,299	1,860,000
1951	605,346	814,406	105,000	52,136	29,777*	278,262	1,885,000
1952	584,238	750,494	96,500	63,134	35,475*	261,211	1,790,000
1953	574,390	692,164	98,610	74,545	35,318*	250,182	1,725,000
1954	584,435	738,670	93,935	78,024	26,833*	280,112	1,802,500
1955	639,128	733,786	93,830	80,172	6,000*	344,584	1,897,500
1955:							
Nov.	52,084	60,673	9,602	10,137	2,466	25,038	160,000
Dec.	62,222	94,681	11,654	13,435	1,022	29,482	212,500
1956:							
Jan.	59,085	40,941	9,015	9,845	500*	30,614	150,000
Feb.	51,818	43,927	4,578	....	500*	31,677	132,500
Mar.	51,023	38,413	5,179	....	500*	34,885	130,000
Apr.	48,394	66,164	6,678	....	500*	33,264	155,000
May	43,224	56,369	7,156	....	500*	30,251	137,500

Source: International Rubber Study Group. * Estimated.

World Consumption of Natural and Synthetic Rubber

(Including Latex)

(Long Tons)

Year	United States	United Kingdom	Canada	Europe*	Rest of World*	Total*
1944	710,783	86,977	34,310	132,500	160,690	1,125,000
1945	799,009	91,047	41,836	87,500	108,164	1,127,500
1946	1,039,296	126,770	39,196	145,000	115,804	1,467,500
1947	1,122,327	156,399	61,452	242,500	153,548	1,735,000
1948	1,069,404	196,286	62,121	392,000	182,379	1,902,500
1949	988,903	186,622	56,362	446,500	207,388	1,887,500
1950	1,258,557	222,425	68,695	448,500	287,055	2,285,000
1951	1,214,298	238,101	70,809	476,500	314,941	2,312,500
1952	1,261,413	202,179	67,099	550,000	254,901	2,335,000
1953	1,338,309	211,453	73,394	521,000	343,606	2,500,000
1954	1,233,012	247,612	71,656	544,250	408,094	2,505,000
1955	1,529,699	266,804	84,528	614,250	480,000	2,980,000
1955:						
Oct.	135,372	25,484	7,416	64,250	29,978	262,500
Nov.	134,430	22,335	8,570	65,250	30,915	267,500
Dec.	131,653	24,913	7,718	73,250	37,466	275,000
1956:						
Jan.	132,231	24,819	7,329	59,250	38,871	262,500
Feb.	125,525	20,993	7,479	66,000	35,003	255,000
Mar.	127,928	19,128	7,367	67,250	30,827	252,500
Apr.	122,128	21,991	7,963	58,750	41,668	252,500
May	122,994	17,670	....	....	106,836	247,500

Source: International Rubber Study Group. * Estimated.

Rim Production

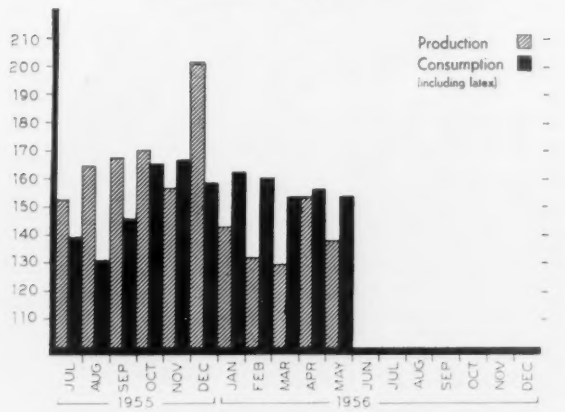
	1951	1952	1953	1954	1955
Passenger Car	29,145,367	24,936,844	31,318,461	25,952,322	38,092,080
Truck & Bus	6,877,419	5,752,674	5,228,321	4,463,689	6,642,329
Agricultural	3,019,581	2,073,116	1,943,487	1,297,040	1,931,768
Earth Mover	28,026	31,791	24,685	21,536	38,859
Total	39,070,393	32,794,425	38,514,954	31,734,587	46,705,036

	1956					
	Feb.	Mar.	Apr.	May	June	July
Passenger Car	2,507,445	2,755,696	2,386,695	2,142,707	1,815,678	1,795,980
Truck & Bus	553,303	541,861	532,293	621,532	645,770	447,592
Agricultural	164,168	198,272	108,515	98,856	144,007	83,413
Earth Mover	6,096	7,952	6,562	3,802	7,628	9,200
Total	3,231,012	3,503,781	3,034,065	2,866,897	2,613,083	2,336,185

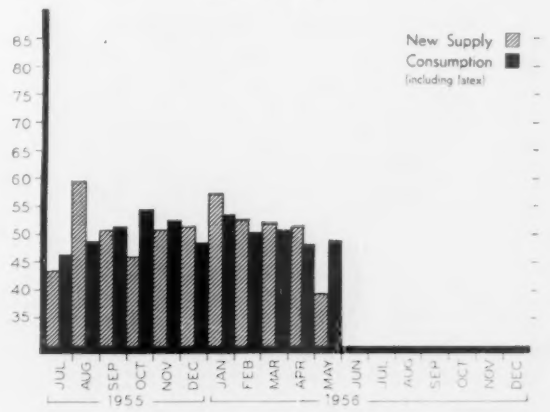
Source: The Tire & Rim Association, Inc.

STATISTICS at a glance

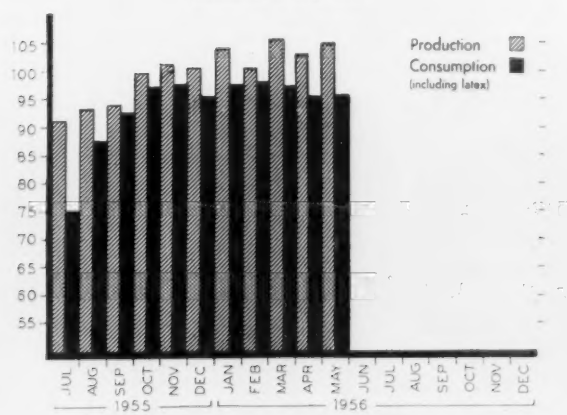
NATURAL RUBBER—WORLD
(thousands of long tons)



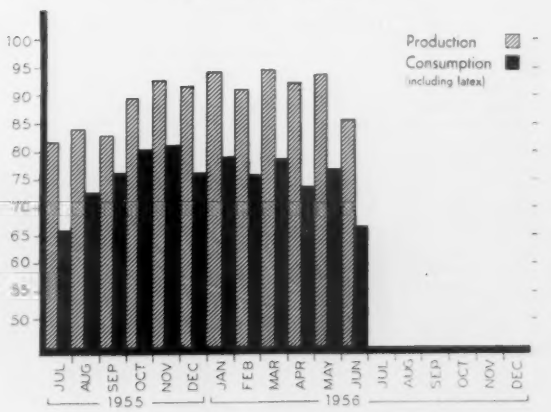
NATURAL RUBBER—UNITED STATES
(thousands of long tons)



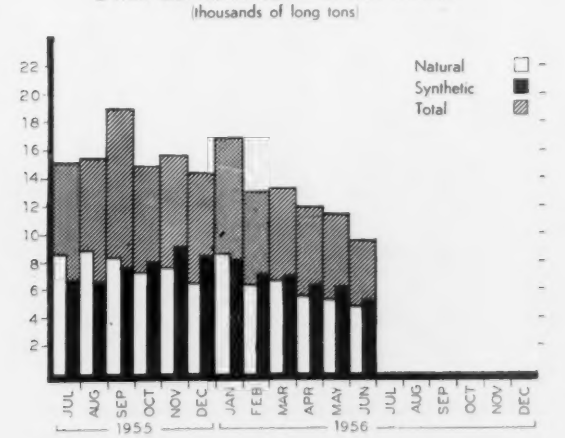
SYNTHETIC RUBBER—WORLD
(thousands of long tons)



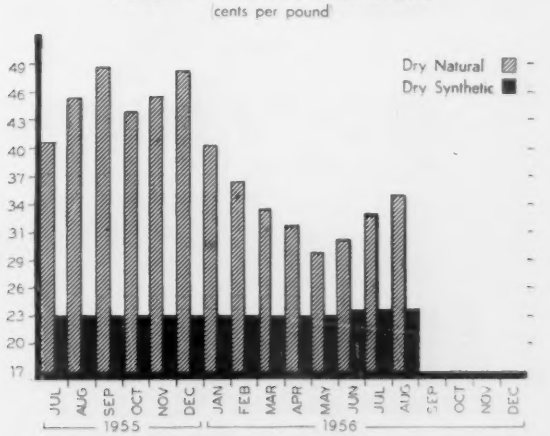
SYNTHETIC RUBBER—UNITED STATES
(thousands of long tons)



LATEX CONSUMPTION—UNITED STATES
(thousands of long tons)



PRICES—NATURAL AND SYNTHETIC
(cents per pound)



Synthetic Rubber in the United States

(All Quantities in Long Tons)

New Supply

Year	GR-S	Neoprene	Butyl	N-Type	Total
1949	310,539	35,215	54,046	11,072	410,932
1950	378,887	50,067	60,915	12,037	501,906
1951	704,529	58,907	76,475	15,333	855,244
1952	654,854	65,745	81,630	16,228	818,447
1953	680,728	80,495	79,801	20,198	861,222
1954	490,405	69,150	58,802	21,396	639,753
1955	801,145	91,357	56,179	32,623	982,304
1955:					
Aug.	68,898	8,511	4,203	2,792	84,404
Sept.	68,228	7,677	5,097	2,821	83,823
Oct.	73,103	8,118	5,501	2,958	89,680
Nov.	75,745	8,537	4,935	2,931	92,148
Dec.	74,794	8,455	4,710	3,068	91,027
1956:					
Jan.	76,028	8,207	6,896	3,125	94,256
Feb.	73,457	8,560	6,229	2,989	91,235
Mar.	77,812	7,822	5,686	3,663	94,983
Apr.	74,502	8,481	5,685	3,648	92,316
May	78,309	7,795	5,647	2,903	94,654
June	69,310	8,929	4,607	2,321	85,167

Consumption

1949	321,137	31,753	52,664	8,827	414,381
1950	416,230	43,781	66,348	11,930	538,289
1951	626,444	48,887	70,500	13,066	758,897
1952	666,420	55,522	71,229	13,866	807,037
1953	624,181	65,900	77,826	16,929	784,836
1954	500,345	57,203	61,464	17,715	636,727
1955	741,997	72,876	53,991	26,035	894,899
1955:					
Aug.	59,746	6,450	4,307	2,219	72,722
Sept.	63,330	6,197	4,578	2,270	76,375
Oct.	66,744	6,626	4,739	2,280	80,389
Nov.	68,111	6,896	4,420	2,234	81,661
Dec.	63,137	6,496	4,197	2,113	75,943
1956:					
Jan.	65,375	6,684	4,223	2,198	78,480
Feb.	62,366	6,430	4,155	2,289	75,240
Mar.	64,458	6,542	4,515	2,373	77,888
Apr.	62,179	6,125	4,228	2,150	74,682
May	63,629	6,379	4,285	2,103	76,396
June	55,222	5,357	3,774	1,763	66,116

Exports

1949	1,401	3,330	178	1,574	6,483
1950	900	4,826	31	1,895	7,652
1951	483	6,825	216	1,725	9,249
1952	9,467	9,813	126	2,695	22,101
1953	7,692	11,494	237	3,245	22,668
1954	11,069	12,062	2,831	4,155	30,117
1955	60,704	18,098	9,895	4,593	93,290
1955:					
Aug.	7,727	1,454	837	386	10,407
Sept.	8,598	1,946	526	602	11,672
Oct.	7,888	1,748	1,041	444	11,121
Nov.	7,786	1,824	894	306	10,810
Dec.	7,837	1,786	968	375	10,966
1956:					
Jan.	7,550	1,757	815	506	10,628
Feb.	9,018	1,521	1,624	449	12,612
Mar.	10,804	1,500	764	522	13,590
Apr.	10,271	1,917	374	587	13,149
May	10,864	2,142	743	443	14,192

Stocks

1949	77,731	4,654	12,224	3,433	98,042
1950	36,942	5,733	7,243	2,840	52,758
1951	105,271	8,379	12,481	3,821	129,912
1952	83,861	8,535	22,716	3,875	118,987
1953	135,153	11,480	24,866	4,346	175,845
1954	115,499	11,349	19,267	4,280	150,395
1955	108,989	12,220	10,500	6,030	137,739
1955:					
Aug.	108,211	11,326	12,395	5,118	137,050
Sept.	107,746	11,209	12,190	4,995	136,140
Oct.	105,746	11,820	12,146	5,041	134,753
Nov.	105,287	11,530	11,646	5,201	133,664
Dec.	108,136	11,971	10,223	5,300	135,630
1956:					
Jan.	111,263	11,850	12,303	6,316	141,732
Feb.	114,389	11,888	13,027	6,602	145,906
Mar.	118,063	12,037	13,458	7,437	150,995
Apr.	121,054	12,042	14,071	8,243	155,410
May	127,163	11,478	15,253	8,788	162,682
June	132,809	12,710	15,222	8,829	169,570

Source: U. S. Department of Commerce.

Natural and Synthetic Rubber Latex in the United States

(All Quantities in Long Tons)

New Supply

Year	Natural	GR-S	Neoprene	N-Type	Total Synthetic	Grand Total
1944	3,090	6,580	4,683	.....	11,263	14,353
1945	4,768	15,176	7,077	.....	22,253	27,021
1946	8,012	24,810	13,595	.....	38,405	46,417
1947	17,675	22,474	6,089	.....	28,563	46,238
1948	32,630	21,494	5,022	.....	26,516	59,146
1949	29,974	21,357	3,651	.....	25,008	54,982
1950	54,401	31,339	5,725	.....	37,064	91,465
1951	54,963	32,972	6,866	2,948	42,786	97,749
1952	48,228	42,273	7,598	4,164	54,035	102,263
1953	75,511	48,112	9,026	5,844	62,982	138,493
1954	74,483	48,379	8,214	6,866	63,459	137,942
1955	92,754	69,364	10,432	10,798	90,594	183,348
1955:						
May	8,849	5,292	880	808	6,980	15,829
June	7,736	4,688	905	1,434	7,027	14,763
July	8,702	4,753	641	993	6,387	15,089
Aug.	8,885	4,456	881	917	6,254	15,139
Sept.	8,109	5,698	994	1,086	7,778	18,887
Oct.	6,900	6,231	922	883	8,036	14,936
Nov.	7,085	6,933	1,004	781	8,718	15,803
Dec.	6,018	6,407	962	874	8,243	14,261
1956:						
Jan.	10,328	6,885	848	919	8,652	18,890
Feb.	7,671	6,943	930	827	8,700	16,371
Mar.	7,800	5,911	782	1,158	7,851	15,651
Apr.	6,995	6,066	969	866	7,901	14,896
May	5,731	4,966	939	614	6,519	12,250
June	....	4,671	907	543	6,121	6,121

Consumption[1]

1944	6,085	6,000	4,400	....	10,400	16,485
1945	3,886	14,500	6,800	....	21,300	25,186
1946	5,714	23,500	13,000	....	36,500	42,214
1947	13,909	22,500	6,500	....	29,000	42,909
1948	28,489	21,500	5,250	....	26,750	55,239
1949	36,117	21,500	3,750	....	25,250	61,367
1950	56,138	31,000	5,500	....	36,500	92,638
1951	46,750	31,031	6,279	2,628	39,938	86,688
1952	53,567	40,562	7,368	3,093	51,023	104,590
1953	67,375	46,473	7,981	3,654	58,108	125,483
1954	75,931	44,173	7,251	4,507	55,931	131,862
1955	86,478	63,982	8,736	8,495	81,213	167,691
1955:						
May	6,643	4,728	768	493	5,989	12,632
June	6,589	4,885	722	587	6,194	12,783
July	5,469	3,830	535	626	4,991	10,460
Aug.	6,784	4,514	770	810	6,094	12,878
Sept.	7,452	5,505	730	878	7,113	14,565
Oct.	7,209	5,704	739	614	7,057	14,266
Nov.	6,620	5,954	829	603	7,386	14,006
Dec.	6,473	5,719	768	538	7,025	13,498
1956:						
Jan.	6,776	5,858	772	670	7,300	14,076
Feb.	6,399	5,913	787	730	7,430	13,829
Mar.	6,438	5,888	729	781	7,398	13,836
Apr.	5,693	4,923	741	692	6,356	12,049
May	5,239	4,745	778	691	6,214	11,453
June	4,708	4,101	640	471	5,212	9,920

Stocks at End of Period

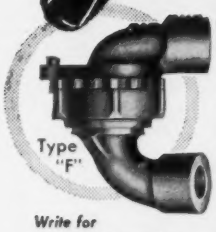
1944	2,443	....	....	....	....	2,443
1945	3,121	....	....	....	....	3,121
1946	4,865	....	....	....	....	4,865
1947	5,033	....	....	....	....	5,033
1948	11,235	....	....	....	....	11,235
1949	5,063	....	....	....	....	5,063
1950	4,927	....	....	....	....	4,927
1951	4,752	3,727	1,245	532	5,504	10,256
1952	6,201	5,040	1,019	902	6,961	13,162
1953	13,532	4,794	1,117	721	6,632	20,164
1954	11,133	5,134	1,087	811	7,032	18,165
1955	13,203	6,980	1,236	1,807	10,203	23,406
1955:						
May	8,854	7,021	767	817	8,605	17,459
June	9,788	6,645	817	883	8,335	18,123
July	11,934	6,950	850	1,397	9,197	21,131
Aug.	11,962	6,201	885	1,319	8,405	20,367
Sept.	12,595	6,448	975	1,527	8,950	21,545
Oct.	12,156	5,798	1,075	1,196	8,069	20,225
Nov.	12,616	6,307	1,089	1,174	8,570	21,186
Dec.	12,645	6,357	1,155	1,248	8,760	21,405
1956:						
Jan.	16,059	6,522	1,093	1,906	9,521	25,580
Feb.	16,735	7,011	1,162	1,943	10,116	26,851
Mar.	18,309	6,867	1,097	2,340	10,304	28,613
Apr.	21,384	7,415	1,163	2,272	10,850	32,234
May	21,234	7,516	1,218	2,194	10,928	32,162
June	20,705	7,277	1,251	1,527	10,055	30,760

Source: U. S. Department of Commerce.
Note: (1) GR-S and Neoprene consumption estimated through 1950.

WHEN PIPING MOVES

FLEXO JOINTS

Offer the Flexibility of HOSE the Strength of PIPE



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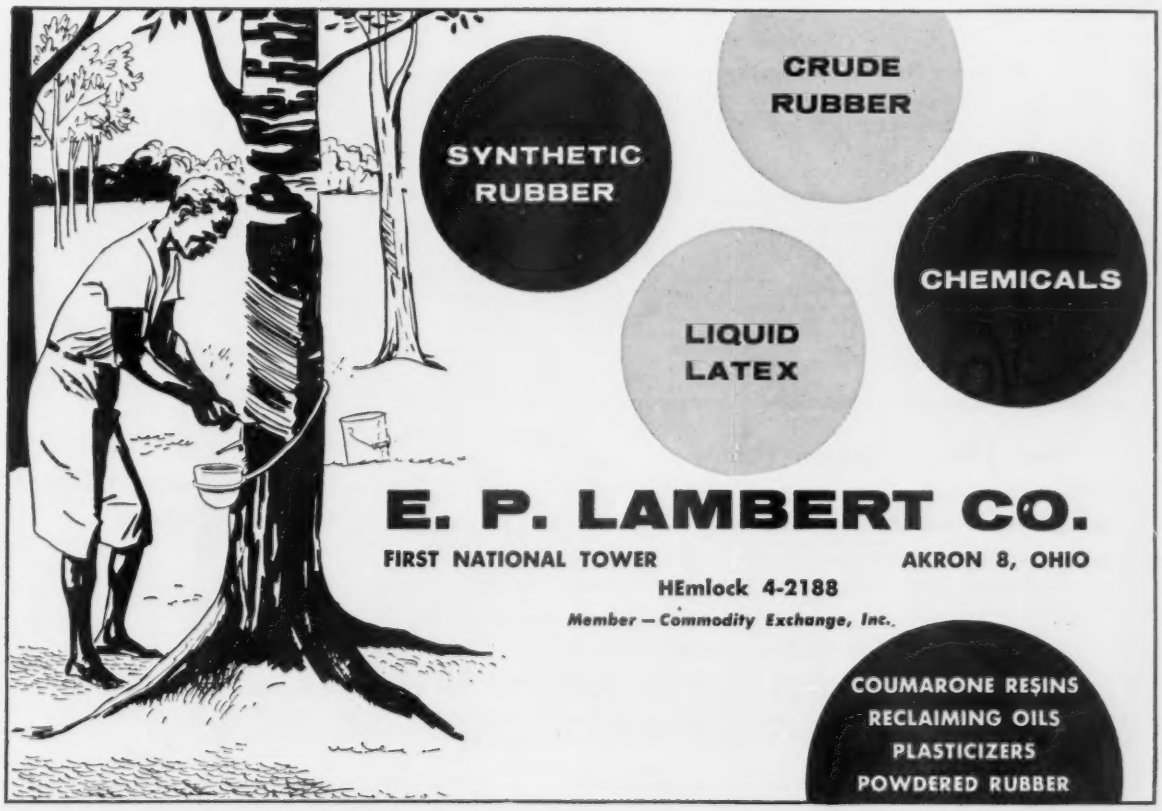

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HEmlock 4-2188

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COUMARONE RESINS
RECLAIMING OILS
PLASTICIZERS
POWDERED RUBBER

Rubber Industry Employment Earnings and Hours

All Rubber Products

Mo.	1955 Production Workers (thousands)	1955 Average Weekly Earnings	1955 Average Weekly Hours	1955 Average Hourly Earnings	1956 Production Workers (thousands)	1956 Average Weekly Earnings	1956 Average Weekly Hours	1956 Average Hourly Earnings
Jan.	208.5	$83.84	41.3	$2.03	229.5	$87.91	40.7	$2.16
Feb.	209.4	84.25	41.3	2.04	224.5	85.81	40.1	2.14
Mar.	211.6	83.64	41.0	2.04	220.8	84.93	39.5	2.15
Apr.	210.9	86.53	41.8	2.07	219.1	86.22	40.1	2.15
May	215.7	87.36	42.0	2.08	215.1	....	....	....
June	219.0	88.83	42.3	2.10	....	....	....	....
July	215.7	86.32	41.3	2.09	....	....	....	....
Aug.	216.8	86.32	41.3	2.09	....	....	....	....
Sept.	223.1	86.74	41.5	2.09	....	....	....	....
Oct.	226.4	89.04	42.0	2.12	....	....	....	....
Nov.	231.2	92.01	42.4	2.17	....	....	....	....
Dec.	233.9	89.21	41.3	2.16	....	....	....	....

Tires and Tubes

Jan.	85.3	97.41	41.1	2.37	93.7	101.00	40.4	2.50
Feb.	86.5	96.46	40.7	2.37	93.2	97.71	39.4	2.48
Mar.	87.4	95.51	40.3	2.37	92.6	97.25	38.9	2.50
Apr.	88.6	102.18	42.4	2.41	92.3	98.50	39.4	2.50
May	89.8	101.88	43.1	2.42	....	....	....	....
June	91.0	105.60	43.1	2.45	....	....	....	....
July	91.5	103.33	42.7	2.42	....	....	....	....
Aug.	91.0	102.72	42.1	2.44	....	....	....	....
Sept.	91.9	101.02	41.4	2.44	....	....	....	....
Oct.	92.3	103.74	42.0	2.47	....	....	....	....
Nov.	94.2	106.26	42.0	2.53	....	....	....	....
Dec.	94.7	99.50	39.8	2.50	....	....	....	....

Rubber Footwear

Jan.	22.1	68.97	40.1	1.72	21.0	74.37	40.2	1.85
Feb.	21.5	69.72	40.3	1.73	20.9	74.74	40.4	1.85
Mar.	21.5	69.72	40.3	1.73	20.7	71.34	39.2	1.82
Apr.	21.3	70.82	40.7	1.74	20.3	72.25	39.7	1.82
May	21.3	70.07	40.5	1.73	....	....	....	....
June	21.6	71.34	41.0	1.74	....	....	....	....
July	21.8	70.99	40.8	1.74	....	....	....	....
Aug.	21.5	67.25	39.1	1.72	....	....	....	....
Sept.	23.5	67.60	39.3	1.72	....	....	....	....
Oct.	24.4	69.20	40.0	1.73	....	....	....	....
Nov.	25.5	72.89	42.1	1.85	....	....	....	....
Dec.	26.2	74.89	40.7	1.84	....	....	....	....

All Other Rubber Products

Jan.	101.1	76.08	41.8	1.82	114.8	79.73	41.1	1.94
Feb.	101.4	76.86	42.0	1.83	110.4	77.95	40.6	1.92
Mar.	102.7	76.49	41.8	1.83	107.5	76.99	40.1	1.92
Apr.	101.0	76.54	41.6	1.84	106.5	78.14	40.7	1.92
May	104.6	78.68	42.3	1.86	....	....	....	....
June	106.4	77.93	41.9	1.86	....	....	....	....
July	102.4	74.37	40.2	1.85	....	....	....	....
Aug.	104.3	75.85	41.0	1.85	....	....	....	....
Sept.	107.7	78.96	42.0	1.88	....	....	....	....
Oct.	109.7	80.56	42.4	1.90	....	....	....	....
Nov.	111.5	83.03	42.8	1.94	....	....	....	....
Dec.	113.0	83.69	42.7	1.96	....	....	....	....

Source: U. S. Department of Labor.
Note: Data are based upon reports from cooperating establishments covering both full and part-time employees who work during, or received pay for, any part of the pay period ending nearest the 15th of the month. These employment series have been adjusted to first quarter 1954 benchmark levels indicated by data from government social insurance programs. Hours and earnings data pertain only to production and related workers.

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market—in Cents)

Average Monthly Price Per Pound

	1949	1950	1951	1952	1953	1954	1955	1956
Jan.	33.37	31.89	45.04	42.96	33.24	34.15	35.07	35.24
Feb.	33.41	32.79	(a)	41.64	33.76	35.00	35.04	36.26
Mar.	33.44	32.65	46.06	41.70	34.10	35.23	34.33	36.70
Apr.	33.84	33.23	46.06	41.79	33.85	35.22	34.23	36.81
May	33.73	33.64	46.06	39.98	34.30	35.34	34.80	36.65
June	33.56	34.61	46.06	41.31	34.11	35.17	34.83	36.67
July	32.99	38.11	46.21	40.37	34.20	35.37	34.61	35.43
Aug.	32.06	38.93	35.93	40.42	33.82	35.19	34.53	34.31
Sept.	30.94	41.62	36.20	39.75	33.69	35.46	33.85	....
Oct.	30.32	40.66	38.13	37.52	33.53	35.24	33.93	....
Nov.	30.52	43.11	42.70	35.59	33.60	34.80	34.87	....
Dec.	31.08	43.37	43.32	33.76	33.52	35.03	34.95	....
Average for Year	32.44	37.05	42.43	39.71	33.81	35.10	34.59	....

Note: The Government established a ceiling price of 45.76c for spot cotton on March 3, 1951. (a) Trading suspended during February.

Production Index for the Rubber Industry

(1947-1949 = 100)

(Based on man-hours)

	1954	1955	1956		1954	1955	1956
Jan.	114	145	147	July	85	137	....
Feb.	114	144	140	Aug.	94	138	....
Mar.	118	146	135	Sept.	118	142	....
Apr.	116	147	135	Oct.	132	147	....
May	121	146	131	Nov.	124	147	....
June	121	149	141	Dec.	128	144	....

Sales by the Rubber Industry

(in Millions of Dollars*)

	1954	1955	1956		1954	1955	1956
Jan.	361	424	415	July	393	471	....
Feb.	360	440	445	Aug.	352	456	....
Mar.	378	466	451	Sept.	346	456	....
Apr.	382	445	445	Oct.	346	447	....
May	378	465	464	Nov.	404	482	....
June	385	465	...	Dec.	417	465	....

Rubber Manufacturers' Inventories

(in Millions of Dollars*)

	1954	1955	1956		1954	1955	1956
Jan.	835	790	935	July	787	853	....
Feb.	848	782	970	Aug.	754	863	....
Mar.	844	805	979	Sept.	799	874	....
Apr.	813	784	970	Oct.	835	902	....
May	798	810	985	Nov.	811	935	....
June	817	850	...	Dec.	821	934	....

Source: U. S. Department of Commerce.
Notes: * Adjusted for seasonal variation.

No. 1 R.S.S.—Annual Average Prices

(New York Market—Cents per Pound)

Year	High	Low	Avg.	Year	High	Low	Avg.
1914	93	56	65.33	1935	13¾	10½	12.37
1915	79	58½	65.85	1936	23	13½	16.41
1916	102	55	72.50	1937	26⅛	14	19.39
1917	90	52	72.23	1938	17⅞	10¾	14.64
1918	70	40	60.15	1939	24	14⅛	17.57
1919	57	38½	48.70	1940	24	18¾	20.10
1920	56½	16	36.30	1941	24⅞	19⅜	22.40
1921	21¾	11½	16.36	1942	22½	22½	22.50
1922	28⅜	13⅜	17.50	1943	22½	22½	22.50
1923	37⅛	24¾	29.45	1944	22½	22½	22.50
1924	40⅜	17⅜	26.20	1945	22½	22½	22.50
1925	121	34⅜	72.46	1946	22½	22½	22.50
1926	88½	36¾	48.50	1947	25	14	20.00
1927	41¾	33	37.72	1948	25	18	21.99
1928	41¼	17	22.48	1949	19¾	15⅞	17.57
1929	26⅞	15½	20.55	1950	86	18	41.10
1930	16½	7½	11.98	1951	76	52	(a)
1931	8⅝	4¼	6.17	1952*	33	26½	29.15
1932	4¾	2½	3.49	1953	31⅜	19⅞	24.21
1933	9⅞	2⅞	5.96	1954	34½	19½	23.61
1934	15⅞	8¾	12.92	1955	52	29⅜	39.16

Note: Price was fixed by Government on August 6, 1941, at 22½c a pound for non-war uses. Free trading was resumed May 1, 1947. (a) Free trading suspended March 31, 1951. GSA selling price ranged between 52 and 66c during balance of year. * Free trading was resumed on July 1, 1952; figures represent only July through December, 1952.

No. 1 R.S.S.—Monthly Average Prices

(New York Market—Cents per pound)

	1949	1950	1951	1952	1953	1954	1955	1956
Jan.	19.23	18.33	71.21	....	29.40	20.22	33.92	41.70
Feb.	18.49	19.40	73.61	....	27.57	19.98	34.90	36.46
Mar.	19.08	19.86	72.05	....	26.59	20.16	31.08	33.68
Apr.	18.53	23.51	....	....	24.66	22.06	31.75	31.74
May	17.92	28.07	....	....	25.52	21.96	31.35	29.61
June	16.36	30.92	....	...	24.42	23.01	34.74	30.54
July	16.45	39.10	....	30.52	23.64	24.12	40.84	33.91
Aug.	16.60	51.63	....	29.36	23.36	23.26	45.85	35.69
Sept.	17.58	55.98	....	27.42	23.06	23.99	48.27	....
Oct.	16.31	62.19	....	27.26	20.82	26.57	43.81	....
Nov.	16.70	73.05	....	29.25	20.58	28.07	44.95	....
Dec.	17.53	71.20	....	31.26	20.92	29.88	48.40	....
Average for Year	17.57	41.10	(*)	29.15	24.21	23.61	39.16	....

Note: (*) Free trading suspended March 31, 1951, and resumed on July 1, 1952.

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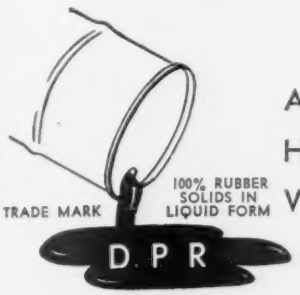
Depolymerized Rubber



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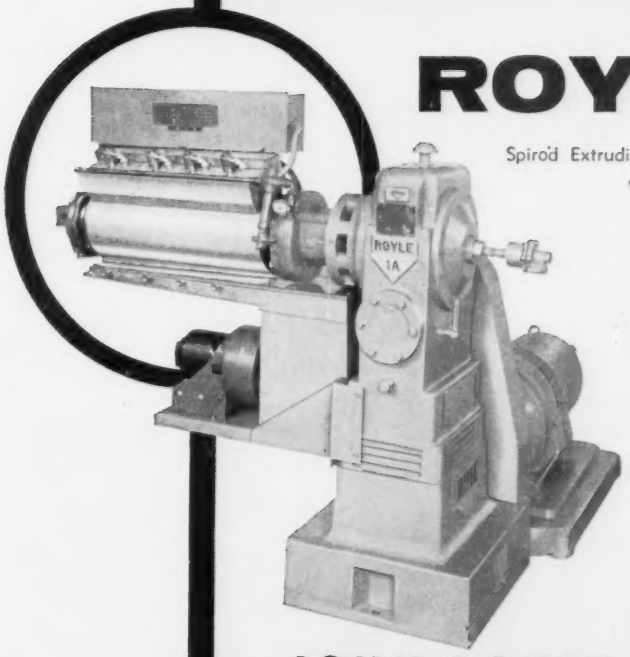

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PATERSON 3, NEW JERSEY

Automotive Pneumatic Casings

(Thousands of Units)

	Shipments					
	Original Equipment	Replacement	Export	Total	Production	Inventory End of Period
1946 (total)	15,310	65,490	1,512	82,312	82,298	2,448
Passenger Car.	11,086	54,684	653	66,423	66,466	1,763
Truck and Bus	4,224	10,806	859	15,889	15,832	685
1947 (total)	25,056	62,871	3,256	91,183	95,550	6,949
Passenger Car.	19,644	52,857	1,608	74,109	77,795	5,444
Truck and Bus	5,412	10,014	1,648	17,074	17,755	1,505
1948 (total)	26,845	49,148	1,787	77,781	81,314	10,698
Passenger Car.	21,589	41,295	656	63,540	66,738	8,773
Truck and Bus	5,256	7,853	1,132	14,241	14,576	1,925
1949 (total)	31,584	43,466	1,467	76,517	76,369	10,638
Passenger Car.	28,129	36,440	509	65,077	65,140	8,904
Truck and Bus	3,456	7,026	958	11,440	11,228	1,734
1950 (total)	41,349	56,808	1,430	99,587	92,754	3,794
Passenger Car.	36,678	47,103	642	84,423	78,598	3,050
Truck and Bus	4,671	9,705	788	15,164	14,156	743
1951 (total)	32,153	44,612	1,677	78,442	83,405	8,765
Passenger Car.	26,729	34,226	723	61,678	65,546	6,973
Truck and Bus	5,424	10,386	954	16,764	17,859	1,791
1952 (total)	29,484	54,342	1,520	85,346	90,411	14,110
Passenger Car.	24,106	45,458	741	70,305	74,341	11,251
Truck and Bus	5,378	8,884	779	15,041	16,070	2,859
1953 (total)	37,949	55,124	1,543	94,617	96,150	15,720
Passenger Car.	33,106	45,798	809	79,713	81,455	13,044
Truck and Bus	4,843	9,326	734	14,904	14,696	2,676
1954 (total)	33,333	55,155	1,753	90,241	89,141	14,762
Passenger Car.	29,741	47,044	928	77,713	76,794	12,217
Truck and Bus	3,591	8,111	826	12,528	12,347	2,545
1955 (total)	47,374	59,246	1,879	108,499	112,178	18,778
Passenger Car.	42,574	50,189	966	93,730	97,223	15,963
Truck and Bus	4,800	9,057	912	14,769	14,955	2,815
1955:						
Sept. (total)	3,142	5,170	140	8,453	9,125	14,674
Passenger Car.	2,749	4,366	74	7,189	7,882	12,407
Truck and Bus	393	804	66	1,264	1,242	2,267
Oct. (total)	3,495	4,460	161	8,117	9,555	16,163
Passenger Car.	3,172	3,556	74	6,802	8,160	13,806
Truck and Bus	324	904	88	1,315	1,395	2,357
Nov. (total)	4,303	3,592	150	8,045	9,603	17,727
Passenger Car.	3,900	2,902	63	6,865	8,198	15,142
Truck and Bus	403	690	87	1,180	1,405	2,585
Dec. (total)	4,045	3,298	172	7,515	8,478	18,778
Passenger Car.	3,641	2,746	80	6,467	7,223	15,963
Truck and Bus	404	552	91	1,047	1,255	2,815
1956:						
Jan. (total)	3,402	4,669	131	8,203	8,979	19,517
Passenger Car.	2,958	4,040	66	7,064	7,661	16,546
Truck and Bus	444	629	65	1,139	1,318	2,971
Feb. (total)	3,342	3,952	178	7,473	8,897	20,933
Passenger Car.	2,919	3,387	90	6,396	7,571	17,701
Truck and Bus	424	565	88	1,077	1,326	3,232
Mar. (total)	3,466	5,034	127	8,627	9,193	21,562
Passenger Car.	3,027	4,372	65	7,464	7,812	18,096
Truck and Bus	439	662	62	1,163	1,382	3,465
Apr. (total)	3,217	5,761	141	9,119	8,834	21,132
Passenger Car.	2,787	4,994	67	7,847	7,530	17,649
Truck and Bus	430	767	74	1,271	1,303	3,483
May (total)	2,770	5,980	130	8,880	8,986	21,296
Passenger Car.	2,349	5,203	65	7,617	7,628	17,714
Truck and Bus	421	777	65	1,264	1,358	3,582
June (total)	2,533	6,627	129	9,289	7,929	19,947
Passenger Car.	2,162	5,659	64	7,885	6,600	16,443
Truck and Bus	372	968	65	1,404	1,329	3,503

Source: The Rubber Manufacturers Association, Inc.

Automobile Production in U. S.

(Civilian Production Only)

Year	Passenger Cars	Trucks	Total	Year	Passenger Cars	Trucks	Total
1936	3,669,528	781,862	4,451,390	1946	2,148,699	930,760	3,079,429
1937	3,915,889	892,382	4,808,271	1947	3,558,178	1,220,634	4,778,812
1938	2,000,985	485,852	2,486,837	1948	3,909,270	1,363,856	5,273,126
1939	2,866,796	704,308	3,571,104	1949	5,108,841	1,123,736	6,232,577
1940	3,692,328	721,637	4,413,965	1950	6,665,836	1,332,263	7,998,099
1941	3,744,500	875,381	4,619,681	1951	5,337,729	1,420,432	6,758,161
1942	220,814	133,083	353,897	1952	4,320,794	1,212,790	5,533,584
1943	0	4,501	4,501	1953	6,121,787	1,202,196	7,323,983
1944	0	124,819	124,819	1954	5,558,897	1,038,045	6,596,942
1945	83,792	313,643	397,435	1955	7,920,186	1,245,018	9,165,204
1955:							
Jan.	635,513	89,676	725,189	July	658,736	109,589	768,325
Feb.	677,705	67,061	744,766	Aug.	620,610	95,119	715,729
Mar.	791,280	102,992	894,272	Sept.	467,845	91,894	559,739
Apr.	753,434	127,887	881,321	Oct.	505,177	95,610	600,787
May	721,139	127,941	849,080	Nov.	745,993	114,448	860,441
June	647,658	119,215	766,873	Dec.	695,096	103,586	799,092
1956:							
Jan.	591,032	98,968	690,000	July	440,980	80,836	521,816
Feb.	560,924	102,384	663,308	Aug.	.....	.....	.....
Mar.	583,169	106,379	689,548	Sept.	.....	.....	.....
Apr.	552,881	101,081	653,962	Oct.	.....	.....	.....
May	474,010	96,114	570,124	Nov.	.....	.....	.....
June	445,758	91,791	537,549	Dec.	.....	.....	.....

Source: Automobile Manufacturers Association.
Note: Figures are based on factory sales. Revisions are made from time to time in these figures and the latest issue should be consulted for accuracy.

Automotive Inner Tubes

(Thousands of Units)

	Shipments					
Year	Original Equipment	Replacement	Export	Total	Production	Inventory End of Period
1946	15,327	59,357	1,424	76,108	77,251	3,820
1947	25,046	46,560	2,483	74,088	79,181	8,059
1948	26,833	40,548	1,119	68,499	70,033	9,641
1949	31,521	31,450	887	63,858	65,114	10,657
1950	41,240	42,671	811	84,726	80,179	....
1951	32,151	32,284	1,071	65,507	67,249	10,094
1952	29,451	32,985	1,014	63,449	65,073	12,036
1953	37,957	36,072	878	74,907	74,425	11,874
1954	25,071	35,576	945	61,593	48,279	9,519
1955	5,001	33,387	1,001	39,389	35,900	6,833
1955:						
Oct.	319	2,595	89	3,004	3,119	6,286
Nov.	355	2,427	92	2,875	3,052	6,734
Dec.	305	2,289	93	2,686	2,719	6,833
1956:						
Jan.	273	3,263	71	3,608	2,917	6,294
Feb.	273	2,548	100	2,921	2,969	6,547
Mar.	281	2,587	93	2,962	3,347	6,848
Apr.	265	2,444	88	2,797	3,094	7,312
May	280	2,515	83	2,878	3,093	7,657
June	269	3,023	79	3,370	2,837	7,349

Source: The Rubber Manufacturers Association, Inc.

Vinyl and Vinyl Copolymer Resins—Sales

(Thousands of Pounds—Resin Content)

	Polyvinyl Chloride and Copolymer Resins							All Other Vinyl Resins		
	Film	Sheeting	Molding & Extrusion	Textile & Paper Treating	Flooring	Protective Coatings	All Other Uses	Adhesives	All Other Uses	Grand Total
1953	63,691	62,385	129,215	52,353	22,152	22,823	27,790	22,411	77,478	480,299
1954	69,943	56,588	147,284	49,546	34,890	23,676	35,148	26,609	74,090	517,773
1955	83,276	51,424	183,736	64,223	56,357	27,439	53,868	31,853	105,644	657,821
1955:										
Apr.	8,227	4,709	15,568	5,779	5,134	2,601	3,271	2,585	8,967	56,842
May	6,985	4,429	14,452	5,240	5,109	2,449	3,547	2,809	9,237	54,256
June	7,103	3,970	14,832	5,036	4,318	2,139	4,403	2,322	8,508	52,630
July	5,925	3,765	11,943	4,304	3,601	2,027	3,540	2,605	6,919	44,631
Aug.	6,478	3,359	13,265	5,136	4,599	2,105	4,759	2,868	8,799	51,367
Sept.	6,983	4,166	15,412	5,582	4,707	2,313	4,017	3,072	9,129	55,382
Oct.	7,498	4,581	16,067	6,043	5,369	2,290	6,318	2,670	9,836	60,672
Nov.	6,855	4,771	18,224	6,271	4,945	2,147	6,818	2,945	9,831	62,807
Dec.	6,273	4,585	16,682	6,089	4,214	1,980	5,458	2,190	10,087	57,558
1956:										
Jan.	6,496	4,928	16,842	6,176	5,181	2,289	6,584	3,331	10,628	62,455
Feb.	6,849	5,296	16,509	5,187	4,894	1,792	6,185	2,718	8,696	58,126
Mar.	7,388	5,280	16,965	4,962	5,016	2,274	5,811	3,162	9,364	60,222
Apr.	6,247	4,674	15,560	4,646	4,494	2,344	7,295	3,114	11,612	59,986
May	5,948	4,403	16,470	4,322	5,075	2,458	6,087	3,288	10,158	58,209

Source: Chemical Division, U. S. Tariff Commission.

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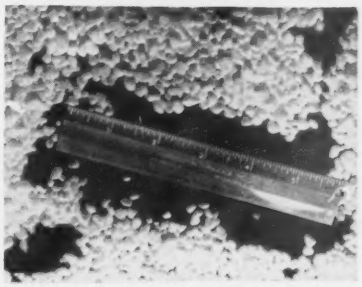

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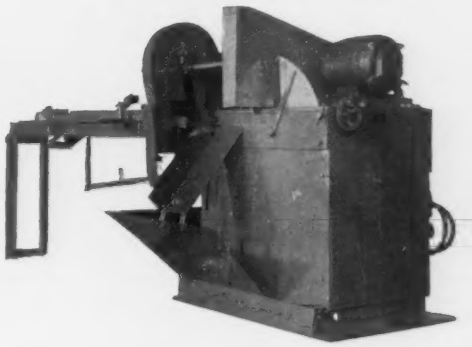

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Various Compounding Materials Consumed by the Rubber Industry

Material	1949	1950	1951	1952	1953	1954	1955
Antimony, Primary:							
Short tons	55	103[c]	19[c]	66[c]	20[c]	49[c]	45[c]
% of total	.005	.007	.001	.004	.001	.004	.004
Asphalt:[a]							
Short tons	18,050	26,819	21,414	33,288	.....	.....	.....
% of total	0.3	0.3	0.3	0.4	.....	.....	.....
Barite (Barytes):							
Short tons	14,000	19,000	15,000	18,000	21,000	20,000	.....
% of total	2.53	3.31	2.13	2.0	2.0	2.0	.....
Carbon Black:							
Short tons	383,365	515,184	530,614	537,273	566,797	511,813	.....
% of total	93.3	92.9	93.9	93.1	94.4	.....	.....
Clay, Kaolin:							
Short tons	267,341	263,306	231,331	240,982	241,052	247,431	.....
% of total	13.1	13.0	12.7	13.2	12.8	13.2	.....
Clay, Fire & Stoneware:							
Short tons	27,148	9,500	.....	9,322	18,475	8,781	.....
% of total	0.3	0.1	.....	0.1	.2	.1	.....
Lime:							
Short tons	715	908	1,126	2,000	1,631	1,555	.....
% of total	.0002	.0002	[d]	[d]	[d]	[d]	.....
Litharge:							
Short tons	1,398	3,047	2,641	2,109	2,230	1,768	.....
% of total	1.2	1.7	1.7	1.5	1.4	1.3	.....
Lithopone:							
Short tons	3,245	4,092	3,295	1,523	1,723	1,701	.....
% of total	4.1	3.9	3.2	2.5	3.3	3.9	.....
Mica, Ground:							
Short tons	3,856	5,776	6,551	5,126	5,668	5,021	.....
% of total	7.0	8.0	9.0	7.0	7.8	6.3	.....
Sulfur:							
Short tons	59,360	75,000	75,000	75,000	80,000	.....	.....
% of total	1.3	1.3	1.4	1.4	1.4	.....	.....
Talc:[b]							
Short tons	53,400	75,900	70,970	64,476	32,137	30,621	.....
% of total	12.0	12.0	11.2	10.9	0.7	.07	.....
Zinc Oxide:							
Short tons	58,496	82,944	71,507	72,774	78,439	71,058	.....
% of total	52.5	51.6	48.4	51.2	52.7	50.7	.....

Source: U. S. Bureau of Mines.
Notes: (a) Solid and semi-solid products of less than 200 penetration. (b) Includes prophyllite and ground soapstone. (c) Does not include precipitated antimony sulfide as in previous years. (d) Negligible.

Reclaimed Rubber

(Including Natural and Synthetic)

(All Quantities in Long Tons)

Year	New Supply	Consumption: Tons	Consumption: % to Crude[a]	Exports	Stocks On Hand at End of Period
1941	274,202	251,231	32.2	13,851	41,750
1942	286,007[b]	254,820	64.6	30,405	42,532
1943	304,058[c]	291,082	59 6	15,678	46,201
1944	260,631[d]	251,083	35.3	11,800	43,832
1945	243,309	241,036	30.2	13,413	28,155
1946	295,612	275,410	26.5	14,461	33,666
1947	291,395	288,395	24.8	14,556	35,943
1948	266,861	261,113	24.4	11,428	32,630
1949	224,029	226,679	22.2	10,637	28,263
1950	314,008	303,733	24 1	11,740	35,708
1951	366,700	346,121	26.6	14,722	45,082
1952	274,981	280,002	22.2	11,180	30,664
1953	298,336	285,050	21.3	11,597	32,319
1954	258,101	249,049	20.2	10,232	30,746
1955	326,649	312,781	20.4	13,988	31,498
1955:					
May	27,911	27,652	21.2	1,056	29,528
June	30,451	29,157	21.5	1,128	29,725
July	24,114	22,563	20.6	1,176	29,939
Aug.	25,223	25,790	21.2	1,144	27,956
Sept.	26,512	26,340	20.6	1,018	27,110
Oct.	28,038	26,597	19.7	1,381	27,565
Nov.	29,124	27,229	20.3	1,313	28,473
Dec.	28,153	24,604	20.0	1,347	31,100
1956:					
Jan.	26,205	25,827	19.6	1,382	31,640
Feb.	27,108	25,571	20.3	1,115	31,875
Mar.	28,468	26,176	20.3	1,163	33,326
Apr.	26,933	23,999	19.6	1,179	34,360
May	25,485	23,560	18.9	1,297	34,863
June	22,052	20,049	18.4	....	35,323

Source: U. S. Department of Commerce.
Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. (a) Includes natural and synthetic rubber. (b) Includes 893 tons of imports. (c) Includes 67 tons of imports. (d) Includes 21 tons of imports.

Cotton, Rayon and Nylon Tire Fabrics

(In Thousands of Pounds)

	Production: Rayon Tire Cord Not Woven	Production: Rayon Tire Cord Woven	Production: Cotton and Nylon Cord & Fabric[a]	Production: Chafer Fabrics (all fibers)	Production: Total Tire Cord and Fabric	Stocks[b]: Cotton and Nylon Cord & Fabric	Stocks[b]: Rayon Cord and Fabric
1955:							
Jan.-Mar.	20,299	79,191	14,870	12,763	127,123	6,863	44,239
Apr.-June	21,550	81,036	18,898	12,724	134,208	8,870	40,689
July-Sept.	20,740	81,996	16,093	12,941	131,770	9,679	47,272
Oct.-Dec.	24,343	77,600	15,754	12,333	130,030	9,182	46.636
Total	86,932	319,823	65,615	50,761	523,131	34,594	178,836
1956:							
Jan.-Mar.	23,707	74,883	16,085	12,815	127,490	10,185	48,936
Apr.-June	21,557	60,644	13,776	10,511	106,488	9,576	41,630
July-Sept.	.....	.....	.....	.....	.....	.....	.....
Oct.-Dec.	.....	.....	.....	.....	.....	.....	.....
Total	.....	.....	.....	.....	.....	.....	.....

Source: Bureau of the Census, U. S. Department of Commerce.
Notes: (a) Combined to avoid disclosing figures for individual companies. (b) At end of period.

Gasoline Consumption

(In Thousands of Barrels of 42 Gallons)

	1950	1951	1952	1953	1954	1955	1956
Jan.	66,981	80,670	86,863	89,634	89,852	96,397	100,642
Feb.	53,274	72,864	82,043	86,458	86,206	88,464	98,088
Mar.	78,780	86,962	87,065	98,158	101,549	105,684	113,128
Apr.	80,350	87,573	98,563	102,044	103,866	111,116	113,034
May	89,035	100,266	101,137	105,918	104,418	115,707	124,114
June	90,174	96,364	99,305	114,703	113,037	120,710	.....
July	91,677	100,567	105,307	112,960	112,231	115,653	.....
Aug.	94,507	101,453	102,954	109,124	110,223	121,816	.....
Sept.	86,725	91,891	100,095	106,158	104,706	113,379	.....
Oct.	89,067	100,209	103,689	106,037	105,607	112,558	.....
Nov.	82,688	88,581	91,326	99,210	102,393	109,212	.....
Dec.	81,932	84,551	95,817	100,225	104,258	111,034	.....
Total	994,290	1,091,951	1,154,254	1,230,629	1,238,346	1,321,730	.....

Source: U. S. Bureau of Mines.

U. S. Gross Imports of Balata, Jelutong, Gutta-Percha, etc.

(All Quantities in Long Tons)

Year	Balata: Tons	Balata: Value	Jelutong: Tons	Jelutong: Value	Gutta-Percha & Other Guttas: Tons	Gutta-Percha & Other Guttas: Value
1944	1,012	$660,805	88	$45,578	10	$4,999
1945	1,361	907,253	....	.....	36	21,970
1946	2,281	2,233,065	304	256,169	423	458,064
1947	1,982	2,276,531	2,878	1,496,887	392	779,591
1948	1,195	805,078	3,401	2,377,765	423	542,788
1949	1,391	814,554	1,043	834,978	197	189,021
1950	2,117	1,589,885	1,789	1,515,162	541	745,418
1951	2,452	1,973,271	1,669	2,608,359	383	430,539
1952	988	762,994	1,636	2,094,983	282	385,890
1953	1,619	866,248	1,027	1,166,837	235	303,116
1954	949	504,065	2,196	2,624,926	417	511,055
1955	1,022	967,369	1,679	1,731,821	284	318,115
1955:						
Aug.	67	41,052	124	123,655	13	14,860
Sept.	151	181,535	97	105,884	10	9,295
Oct.	261	254,853	206	213 394	8	12,039
Nov.	11	94,967	97	97,981	12	21,302
Dec.	66	51,938	138	114,286	5	3,318
1956:						
Jan.	49	30,670	112	99.777	9	18,066
Feb.	68	57,777	140	137,190	11	13,642
Mar.	164	116,302	135	123,366	17	21,620
Apr.	93	62,425	111	105,593	34	48,766
May	31	22,595	152	159,121	33	34,803

Source: U. S. Department of Commerce.

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Address all replies to Box Numbers care of RUBBER AGE, 101 West 31st St., New York 1, N. Y.

Copy for October, 1956 issue must be received by Friday, September, 28th.

POSITIONS WANTED

TECHNICAL DIRECTOR available. Broad technical-practical experience with large and medium sized plants, producing chemical sponge, mechanicals and compression plastics for automotive, air-craft, etc., industries. Capable as Production Manager. Cost conscious. Midwest location desired. Address Box 710-P, RUBBER AGE.

EXPERIENCED rubber technical man wishes opening with opportunity for advancement. Address Box 673-P, RUBBER AGE.

GENERAL MANAGER: Considerable managerial and technical experience in manufacturing, product development and sales. Capable rubber technologist and cost accountant. 15 years in molded goods and insulated wire and cable. Chemical engineer. Also liberal arts graduate. Address Box 674-P, RUBBER AGE.

CHEMIST B.S. with long experience in adhesives, pressure sensitive tapes, protective coatings, emulsions, laminated, extruded products. I can best serve the interest of my laboratory chief as an experienced and adaptable assistant, to help carry his projects to completion. I offer my considerable experience at a salary reasonable to both parties. If an interview is arranged, I wish to have direct talk only with my immediate chief. Address Box 700-P, RUBBER AGE.

ASSISTANT SUPERINTENDENT: 21 years experience in the production of latex dipped goods. Energetic, possesses initiative—can handle personnel—desires permanent position with established rubber company. Address Box 692-P, RUBBER AGE.

MECHANICAL ENGINEER with 12 years molded rubber background of product and tooling design, manufacturing and sales, desires new connection with medium sized rubber company. Can contribute experience in cost reduction, administration and organization, together with excellent contacts in volume custom markets. Address Box 693-P, RUBBER AGE.

PRODUCTION MANAGER, now so employed, to relocate. Chemist with broad technical experience in all phases of manufacture of latex foam rubber. New England location desired. Address Box 695-P, RUBBER AGE.

TECHNICAL SALESMAN: Over twenty years successful experience research, development, production and sales elastomers, rubber, chemicals. Exceptional background paper and textile applications. High level contacts. Seeks position sales development materials related to same fields. Northeast location preferred. Completely equipped home office, sample laboratory. Married, family, car. Address Box 698-P, RUBBER AGE.

GENERAL FOREMAN: 12 years experience in molded goods, seeks opportunity with medium sized, progressive firm. Familiar with all phases of operations on automotive mechanicals, shoe soling, tubing, matting, etc. Consistent record of low departmental costs. Address Box 701-P, RUBBER AGE.

TECHNICAL SERVICE, development, applications, chemical market research position with polymer or raw materials supplier to rubber, plastics industries sought by chemical engineer with 12 years varied experience, particularly rubber. Prefer east coast. Address Box 706-P, RUBBER AGE.

MANAGER: Fifteen years experience manufacturing and developing all types flat conveyor and transmission belting and other mechanical goods, impregnations and coatings. Also solvent cements and latices, wax and asphalt treatments. Prefer small progressive eastern company. Address Box 709-P, RUBBER AGE.

RUBBER CHEMIST: Desires managerial position Greater Boston area. Over twenty years experience development, production, field service in proofing, coating, adhesives. Address Box 711-P, RUBBER AGE.

HELP WANTED

TECHNICAL ASSISTANT TO GENERAL MANAGER: Small manufacturer located in Detroit area engaged in the production of industrial latex products requires chemical or mechanical engineer with at least three years experience in latex processing. Salary commensurate with ability. All fringe benefits. Excellent opportunity with growing organization. Address Box 713-W, RUBBER AGE.

OUR FEE PAID BY COMPANY

GENERAL MANAGER — $15,000
Reporting to Pres. Mechanical rubber goods. Excellent firm — East — Proven Administrative ability.

FACTORY MANAGER — $15,000
Medium sized mechanical goods mfer.; Midwest. Challenging assignment for right man.

Contact GLADYS HUNTING in confidence

DRAKE PERSONNEL, INC.
220 S. State St., Chicago 2, Ill., HArrison 7-8600

HELP WANTED—Continued

WANTED: Chemist, B.S., experienced in electrical insulating materials. Please state experience and salary expected. Address Box 663-W, RUBBER AGE.

IN SOUTH CAROLINA
Rubber Chemist to head new development group, director level. PhD. preferred but not required. A real opportunity in an expanding company.
CONTINENTAL TAPES
Cayce, South Carolina

RUBBER RESEARCH CHEMIST with BS or MS degree required to carry out research on new types of elastomers being developed on a fundamental research project. Experience in rubber compounding and testing is desirable. Apply HOOKER ELECTROCHEMICAL COMPANY, Industrial Relations Dept., Niagara Falls, New York.

FACTORY MANAGER: Thoroughly experienced for plant employing 100 on miscellaneous molded, extruded and lathe cut goods. Excellent opportunity in plant in fine resort area, 40 miles from New York City. Address Box 702-W, RUBBER AGE.

CHEMIST: Practical compounder for plant employing 100 on miscellaneous molded, extruded and lathe cut goods. Excellent opportunity in plant in fine resort area 40 miles from New York City. Address Box 703-W, RUBBER AGE.

SUPERVISORS: Openings for press room foreman in plant employing 100 on miscellaneous molded, extruded and lathe cut goods. Excellent opportunity in plant in fine resort area 40 miles from New York City. Address Box 704-W, RUBBER AGE.

VINYL CHEMIST
Experienced in compounding and coating plastisols and organosols. Excellent opportunity in New England area. Give complete resumé and salary expected. All replies will be strictly confidential.
Address Box 694-W, RUBBER AGE

TECHNICAL DIRECTOR
Established rubber industry supplier in middle west has opening for chemist or chemical engineer as Technical Director and administrator for laboratory research and control. Practical rubber compounding and factory experience necessary as well as thorough technical and administrative background.
Commensurate salary, pension, group insurance, etc. Submit complete information and recent snapshot as basis for interview.
Address Box 697-W, RUBBER AGE

EXECUTIVE TECHNICAL SALES OFFICE
Nelson EMPLOYMENT SERVICE
specialist for the "Rubber Industry"
HAROLD NELSON — 653 FIRST NATIONAL TOWER
PHONE: PORTAGE 2-8801 — AKRON 8, OHIO

PERSONNEL SPECIALIST TO THE RUBBER INDUSTRY
Administrative,
Sales,
Technical and Production Supervision
Write or phone Leslie E. King, Manager Rubber and Technical Divs.
AKRON EMPLOYMENT SERVICE
Suite 607-08 Metropolitan Building, Akron, Ohio. PArtage 2-7641
Member: Chamber of Commerce, Ohio Private Employment Agencies Association and National Association of Personnel Consultants with 56 affiliate private agencies covering 26 states.

FLORIDA OPPORTUNITY
LATEX CHEMIST

Outstanding opportunity for qualified latex chemist or engineer with expanding Florida organization. Should have degree in chemistry from recognized school. Experience in dipping natural and synthetic latices; coagulants, both alcoholic and water; experimental work and heat-sensitivity; knowledge of pre-curing and low ammonia mixes necessary. Salary dependent on qualifications. Age 30-40. Give full information, background, previous experience and salary range. Include photograph with resumé. All replies confidential.

ELASTOMERS, INC.
Ft. Myers, Florida

RUBBER
RESEARCH AND DEVELOPMENT
OPPORTUNITY
in
CLEVELAND

Physical or Physical Organic Chemist

We need a self-starter to plan and execute research and development programs — studying the nature of rubber and metal interfaces and relating the chemistry and structure of rubber to its dynamic properties, particularly vibration absorption and torsion.

Should have doctorate or the equivalent in industrial research and development. We'd like to hear from someone with at least five years in rubber research who has demonstrated independence and initiative.

This man will correlate these programs with manufacturing division which is enlarging and diversifying its product line.

Clevite Research Center develops new principles and new products for other units of Clevite Corporation. It is a young organization where good work is quickly recognized. Your professional growth will be accelerated by your associations with people from other fields such as physics, electronics, mechanics.

Address:

E. A. Gentry, Personnel Manager
CLEVITE RESEARCH CENTER
540 East 105th St.
Cleveland 8, Ohio

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Address your letters to—

Box Number (show number)
c/o RUBBER AGE
101 West 31st Street,
New York 1, N. Y.

RUBBER CHEMIST: B.S. degree. Compound development work dealing directly with production in small, progressive company in southwestern U. S. Opportunity for advancement. Give complete resumé and salary expected. Address Box 708-W, RUBBER AGE.

PROCESSING OR TOOLING ENGINEER for precision molded rubber products. Processing experience in fields of extrusion, molding, finishing, or experience in mold or small tool design and methods. Work for prominent midwest manufacturing organization. Salaries commensurate with experience and ability. Many other company benefits. All replies kept strictly confidential.

Address Box 696-W, RUBBER AGE

WANTED, WIRE AND CABLE SALES ENGINEER—Manufacturer of magnet wire, aircraft wire, stranded lead-wire, plastic wire and harnesses, located in Mid-west, has excellent opportunity open for engineer experienced in part or all of those categories, to do liaison work with customers' engineers, cooperating with salesmen. Travelling on an unscheduled basis is required. This is a permanent position, with hospitalization, group insurance and pension plan, all company-paid. Salary open. Reply by letter giving full details of age, education, experience, qualifications. Replies will be held confidential—our employees know of this ad. Address Box 712-W, RUBBER AGE.

WANTED—TECHNICAL DIRECTOR'S ASSISTANT

Excellent opportunity for advancement with medium sized Midwestern firm manufacturing mechanical goods and coated fabrics mainly for the Graphic Arts Industry. Require an energetic man with initiative for method improvements and cost reduction. Experience in this line is desirable. Must also have some experience in labor relations. Write giving age, experience and education in first letter. Replies held in strict confidence.

Address Box 699-W, RUBBER AGE

ORGANIC CHEMIST

BS in organic chemistry or rubber technology, with 5 years experience in compounding and application of natural and synthetic elastomers, including silicone and polyurethane. Work will consist of laboratory evaluation of elastomers, product development, application engineering, and consultation with design engineers.

ANALYTICAL CHEMIST

BS in analytical chemistry and at least 5 years industrial experience. In addition to classic type of analysis, should be familiar with latest instrumentation used in analysis of inorganic materials, such as polarography and spectrophotometry. Will work with ferrous and nonferrous alloys, with an emphasis on light metal alloys such as aluminum, magnesium, and zinc.

●

Sandia Corporation, a subsidiary of Western Electric, is located in Albuquerque, New Mexico, and is engaged in nuclear weapons research and development for the Atomic Energy Commission.

Send resumé to:
Mr. Brian Finley
Staff Employment Section 570

SANDIA CORPORATION
Albuquerque, New Mexico

What to know what IGEPON is?
Or who makes DPR?

The Chemical Brand Name Section of the new 1955-56 RUBBER RED BOOK contains the answers to these and a thousand and one other questions.

See page 671 for Brand Name data.

Directory of CONSULTANTS

R. R. OLIN LABORATORIES, INC.
(Established 1927)
Consultation—Development—Research for rubber and plastics industries and for raw materials suppliers for same.
P. O. Box 372RA — Akron (9), Ohio **Tel HEmlock 4-3724**

SOUTH FLORIDA TEST SERVICE
(Established 1931)
Corrosion, weathering and sunlight tests. Four locations in Southern Florida for inland, salt atmospheric, tidewater and total immersion exposure tests.
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PHILIP TUCKER GIDLEY
Consulting Technologist—Research, product development, formulas, factory plans, engineering, chemical and physical testing.
Fairhaven, Massachusetts

HALE AND KULLGREN, INC.
Specialists in Process and Plants for Rubber and Plastics
A Complete Engineering Service: including: Economic Surveys; Process Design; Installation; Contracting and Operation.
613 E. Tallmadge Ave., Akron 10, Ohio

Foam, Tire and Rubber Goods Plants and Equipment,
Mechanical and Electrical Designs, Engineering Supervision.
JOHN F. MOORE, 100 Hillsdale Avenue, West, Toronto 7, Ont., Canada

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"They Last Longer" REG. U. S. PAT. OFF.

DRESS SHIELDS
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RUBBER SHEETS
RAINCAPES & COATS
RUBBER SPECIALTIES
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RUBBER DAM & BANDAGES — SHEET GUM

RAND RUBBER CO. BROOKLYN, N. Y. U. S. A. MFRS.

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Cord Latexing, expanding mandrels, automatic cutting, skiving, flipping and roll drive wrapping machines
ENGINEERING FACILITIES FOR SPECIAL EQUIPMENT
Call or Write

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AIR BAG BUFFING MACHINERY
STOCK SHELLS HOSE POLES
MANDRELS
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Representatives: Akron New York

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To Your Specification
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881 State St. Tel: State 7-5662
Otto J. Lang, General Manager

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CUSTOM MIXING, GRINDING and DISPERSION. Production time available on Rotary Cutters, Colloid Mills and explosion-proof Churns with attached filtering mediums. At your service—the technical know-how and completely equipped control laboratory. ADHESIVES & COATING SPECIALTIES, INC., Bldg. #22, 410 Freilngnuysen Ave., Newark 5, N. J.

LATEX COMPOUNDER AND CHEMICAL MANUFACTURER has ample facilities in Philadelphia area to custom manufacture latex compounds, emulsions, chemicals, polymers, sulfonated oils, textile resin finishes, drum to tank car quantities. Address Box 707-B, RUBBER AGE.

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Master Batching
Mixing of all kinds
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Custom
BANBURY OR MILL MIXING
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Custom Mixing RUBBER-PLASTICS
We do milling and compounding of all types—black or color—master batches
All mixing done under careful supervision and laboratory control.
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MAIN SALES OFFICE and FACTORY: BUTLER, N. J.

EQUIPMENT WANTED

WANTED: 1—3-roll vertical lab calender in good condition. Also tape testing laboratory equipment. Address Box 705-E, RUBBER AGE.

WANTED: Hydraulic Press 20 to 26" upstroke ram with eight 3" steam platens 42 x 42", 315 to 500 ton. ALCO MACHINERY & SUPPLY CO., 5 Beekman St., New York, N. Y. Phone: WOrth 4-7875.

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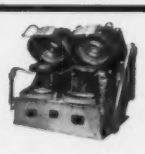
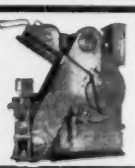

Complete Line of Rubber and Plastics Machinery

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Ball & Jewell Midget 1 HP MD
Van Dorn Model C-100, 1 HP MD
Abbe Size "O" 5 HP MD 9" x 17" Hopper Mouth
Ball & Jewell #1 10 HP MD

DIE CASTING MACHINES

Loch Engineering, Zinc, Motor Drive 10 HP

EXTRUDERS

Laboratory 2" Screw 1 HP MD, elec. heated
Royle No. 1, 3 stage oil heated, excellent condition
Royle No. 2, 15 HP Motor, 3½" Screw, elec. htd. Die head
Royle No. 3, 30 HP Motor Drive, 4½" Screw, side delivery Q.O. head
Allen-Williams, 8" Strainer Head, 40 HP Motor Drive
4 Zone, elec. htd., 4" Screw, 60" barrel, practically new

INJECTION MOLDING MACHINES

1 oz. Van Dorn Model H-200
2 oz. HPM No. 54 clamp 22 ton, injection 12 ton, manual controls
2 oz. NRK No. 1300, plasticor vertical, hand operated
2 oz. Van Dorn Model H-200 1953, never used
2 oz. Watson-Stillman, frame 6 oz. cap., Motor Drive 20 HP, 1945
2 oz. Watson-Stillman vertical motor drive
3 oz. Fellows fully automatic
4 oz. DeMattia semi-automatic
4 oz. Crown Moldmaster complete
4 oz. Watson-Stillman horizontal
4 oz. Reed-Prentice Wheello controls 15 HP MD
6 oz. Watson-Stillman
8 oz. Reed-Prentice double toggle
8 oz. Impco Mdl. VF-8, Compress. & Transf. features, extra 12 oz. cyl.
9 oz. HPM 200 ton, fully automatic
12 oz. Lester W/Glengarry Weigh Feed
16 oz. Reed-Prentice No. 10-E-16, electric heated, 1948
22 oz. Impco, Model VF 8-22
24 oz. DeMattia Model B, inspect in operation

MILLS, RUBBER, PLASTIC

16" x 40" Farrel, Rubber/Plastic, 4 in line or individually
16" x 48" Farrel, Rubber/Plastic
18" x 50" Thropp Motor & Drive all on one bed plate
18" x 50" Farrel, Rubber, Plastic, 4 in line or individually
20" x 22" x 72" Farrel Rubber/Plastic
No. 2 Abbe Eng. Co., Eureka Porcelain Jar Mill, Roller Chain, Motor Drive—2

PRESSES, HYDRAULIC

5 ton, Logan, Twin Ram 7½ HP, MD
15 ton, Stokes No. 200D-2 automatic—10
15 ton, Consolidated self-contained
20 ton, Elmes No. 3429P Laboratory, electrically heated platens 8" x 8"
25 ton Consolidated 24" x 30" self-contained pump & motor
30 ton, Watson-Stillman Laboratory, platens 8" x 8"—2
30 ton, Baker, full automatic Model 958, excellent condition, new 1951
30 ton, HPM, upmoving 12" x 12" platen 12" DLO 12" str. with controls
35 ton, HPM, down-acting, ram 6" x 6" str., bed 12" x 6" DLO 15" self-cont.
40 ton, Francis 4 opening, 12" x 12" elec. heated platens
40 ton, Loomis, 4 opening, 12" x 12" elec. heated platens, MD self-cont.
50 ton, Baldwin-Southwark Angle Molding Press, practically new
50 ton, Bliss 20" x 20" platen, 60" str. 60 HP MD
50 ton, Stokes, semi-auto., self-cont.
50 ton, Bliss, bed 21" x 20" stroke 20" 60 HP MD
50 ton, Farrel, 12" x 12"
50 ton, Watson-Stillman, 12" x 17" elec. htd. platens, MD pump
60 ton, Weaver, 42" between housings
75 ton, Farquhar, up-acting, 30" x 42" platens
75 ton, Burroughs, down-acting ram 8" x 10" stroke, platen 17½" x 17"
100 ton, Farquhar, drawing, stroke 36", hi-speed appr., press, return
100 ton, Farquhar, self-cont., down-acting ram 11" x 26" str. 30" x 28"
100 ton, Watson-Stillman, platens 13" x 13", ram 8½" x 3" str., MD pump
100 ton, Watson-Stillman, 4-post, platens 11¾" x 12". Ram 8" x 15" stroke
100 ton, Watson-Stillman, bed 22" x 20", DLO 24", self-contained
100 ton, Lake Erie hi-speed, 24" x 24" bed, 12" DLO, self-cont.
150 ton, Carey, platens 20" x 16" Adj., DLO, 8"-28"
200 ton, Elmes 14" ram x 42" str., 24" x 30" bed
250 ton, Niles-Bement-Pond wheel press
275 ton, Watson-Stillman up-acting 24" x 54" platens, 2-14" rams
300 ton, Watson-Stillman transfer press 33" x 27" platen, auto.
300 ton, Lake Erie, 30" x 30" platens, self-cont., semi-auto.
350 ton, Elmes, self-cont., down-acting, ram 19" x 20" str., 30" x 36" str.
393 ton, Farrel, 2 opening 15", steam platens 48" x 48", 4 rams 10" x 24" str.
600 ton, Watson-Stillman, hobbing, motor driven pump
625 ton, Farrel, steam platens 52" x 52", pump, mtr., controls, under power
669 ton, Morane, 3 upmoving rams, 16" stroke
750 ton, HPM, down-act., bed 59" x 44", DLO 72" ram 28" x 43" str.
1200 ton, HPM, 15 opening, 100" x 120" steam platens, self-cont.—2
2400 ton, Birmingham, belt press, 65" x 26'6", 24"-11" rams

PRESSES, PLASTIC MOLDING

15 ton, Stokes No. 200D-2 automatic—10
30 ton, Baker, full automatic model 958, excellent condition, new 1951
50 ton, Stokes, semi-auto., self-cont.
50 ton, Watson-Stillman, 12" x 17" elec. htd. platens, MD pump
215 ton, Lake Erie, semi-auto., self-cont., hydr. plastic molding

PRESSES, TRANSFER

300 ton, Watson-Stillman hydraulic transfer press, 33" x 27" platen, auto.

FURNACES AND OVENS

Megatherm, 3/60/220, 3 KW, 2-3 lb. phenolic per min.—8
Despatch Mdl. Diaz-7583, 3 drawers, 17" x 17" x 5"—2
Despatch Mdl. PLHD-8, 8' drawers, 12" x 18" x 2½"—2
Thermex, Mdl. x875, 1 Ph., 60 Cy., 230 V.
Thermionic Induction Heater
Lydon, 21 drawer, preheating ovens, motor & blower ¼ HP motor, 6' x 18" x 30"

TABLET MACHINES

Model G-4 Stokes single punch dual pressure 15 ton MD.
Model T Stokes, hydraulic equalizer, motor drive, 3 HP
Model R Stokes, single punch, variable speed motor drive, 3 HP
Model R-1 Stokes, single punch, vari-speed, MD, 3 HP
No. RB-2 Stokes, 16 station, motor drive, 2 HP
Model RD-4 Stokes, 16 punch, rotary, motor drive, 2 HP
Model S-5 Stokes dual pressure, 40 ton, motor drive, 72 HP, 1952
Model RDS-3 Stokes, 15 station, motor drive, 3 HP
Model 45 Defiance, 200 ton, 15 HP, vari-speed, MD
No. 2 RP Colton, 16 punch, rotary, motor drive, 1½ HP
No. 3RP Colton, 16 punch, rotary, motor drive, 1½ HP
No. 280G Stokes, single punch
Model F, Stokes, single punch, MD
No. 5 Arthur Colton, motor drive, 3 HP
No. 5½ Arthur Colton, motor drive, 3 HP
No. DD-2 Stokes, 19 stations, US vari-drive, 10 HP
No. DD-2 Stokes, 23 stations, US vari-drive, 10 HP
No. DD-2 Stokes, 23 stations, Reeves vari-speed drive, 7½ HP
Model E Stokes, single punch 2 ton vari-speed MD

PUMPS

200 GPM, 2500 psi Worthington horizontal, Duplex, DA 3¾" x 18"

MIXERS

No. 9 Banbury, body only
No. 3A Banbury, 150 HP, MD, Rubber/Plastic
No. 9 Banbury, 200 HP, motor drive, inspect in operation rubber/plastic
No. 11 Banbury, bodies only—2

CALENDERS

6" x 13" Farrel Laboratory, like new
9" x 48" American Tool, 2 roll doubling, belt drive, rubber, plastic
24" x 48" Farrel-Birmingham, 3 roll, 50 HP, DC motor

ROLLER COATERS

Union Roller Coater, Model B30-50 coating & feeding machine, 3 HP vari-drive

TAKE-UP EQUIPMENT

30" Watson, type D-c, take-up
30" Royle, cable take-up
36" Royle, capstan, take-up

TRIMMER

50 ton model V Metal Stamping Trimmer, model 1C ¼—6

SLITTING MACHINE

Type 6 Cameron Slitter 42" width take-up, 7½ HP MD

JOHNSON MACHINERY COMPANY
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CAP WELD WOODEN SHELLS

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- OFFER MAXIMUM LONG-LIFE SERVICE
- AVAILABLE IN STANDARD DIAMETERS

(other diameters on special order)

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COLORS
FOR RUBBER-VINYLS

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Ohio Representative: PALMER SUPPLIES CO., 2281 Scranton Road, Cleveland 13; 800 Broadway, Cincinnati 2,
Pacific Coast: ERWIN GERHARD, 40 California St., San Francisco 11, Calif.

BROOKLYN COLOR WORKS INC.,
MORGAN & NORMAN AVES., BROOKLYN 22, N.Y.

AKRON RUBBER MACHINERY CO., INC.

200 South Forge St., Akron 9, Ohio, Phone HEmlock 4-9141

We are one of the foremost specialists in supplying everything in used, reconditioned, and new machinery for the Rubber and Plastics industries only.

ARMACO

NEW—Laboratory mills, hydraulic presses, extruders, bale cutters, and vulcanizers. We are interested in purchasing your surplus machinery or complete plant.

EQUIPMENT FOR SALE—Continued

Electric and steam heated platens, all sizes up to 42″ x 42″. New presses from laboratory up to 1,000 tons. Pumping units up to 10,000 p.s.i., all capacities. CLIFTON HYDRAULIC PRESS CO., 290 Alwood Rd., Clifton, New Jersey.

FOR SALE: 2—Farrel 16″ x 40″ rebuilt mills; 1—Taylor Stiles giant rubber cutter; 1—Ball & Jewell rotary cutter, Model O, m.d.; 1—6″ x 12″ laboratory mill, m.d.; 1—new 3-roll 6″ x 16″ laboratory calender, m.d.; 2—Baker-Perkins size 15, 100-gallon jacketed mixers; 2—horizontal dry powder ribbon mixers, 500#, 1500#; 1—Fitzpatrick "D" comminutor, s.s. contact parts packeted; 1—Mikro-Pulverizer #2TH, with motor; 2—Reed-Prentice 4 & 8 oz. injection molding machines; also other sizes Hydraulic Presses, Tubers, Banbury Mixers, mills, vulcanizers, calenders, pellet presses, cutters. Wanted: Your surplus rubber machinery. CONSOLIDATED PRODUCTS CO., INC., 70 Bloomfield St., Hoboken, N. J. HOboken 3-4425; N. Y. Phone: BArclay 7-0600.

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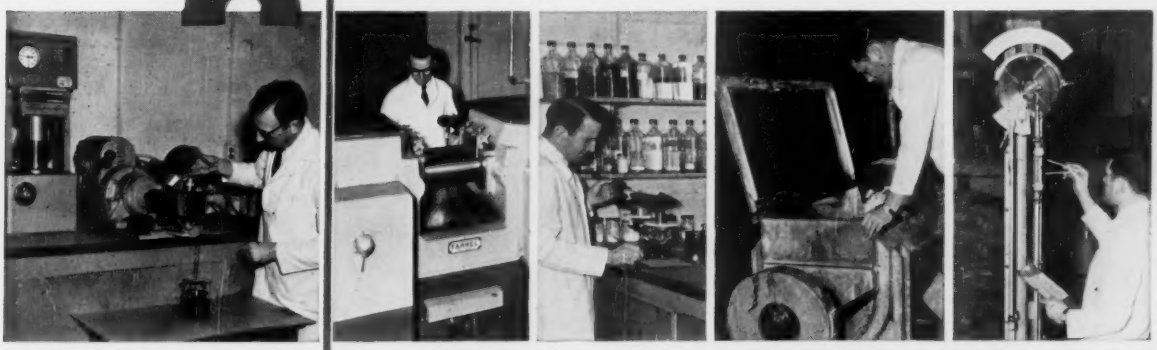

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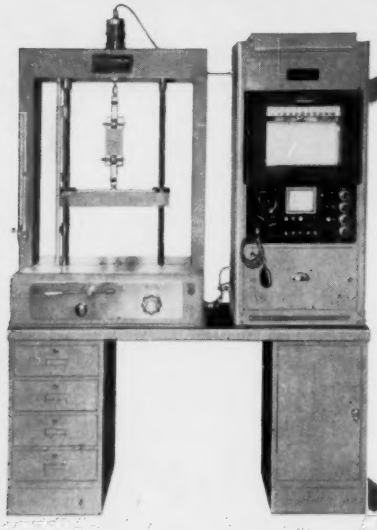

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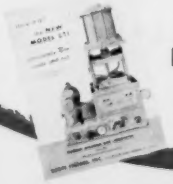

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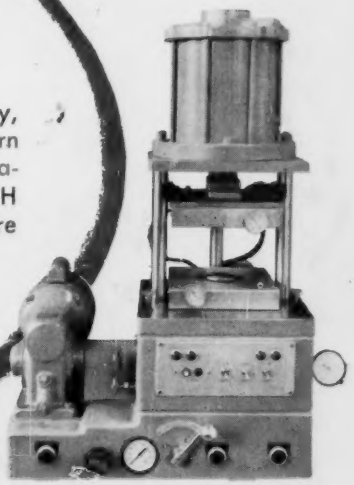

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